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FROM

A. C. HAMMOND,

SEC'Y STATE HORTICULTURAL SOCIETY,

Warsaw, Ill.

J. C. Coe
French Grove
Ills

# TRANSACTIONS

OF THE

# Illinois State Horticultural Society

FOR THE YEAR 1887

BEING THE

## PROCEEDINGS OF THE THIRTY-SECOND ANNUAL MEETING

HELD AT

## PRINCETON, DECEMBER 13, 14, 15,

ALSO PROCEEDINGS OF THE

CENTRAL AND ALTON-SOUTHERN DISTRICT SOCIETIES, ALSO ELMWOOD, KANKAKEE AND WARSAW SOCIETIES

FOR THE YEAR 1887.

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NEW SERIES—VOLUME XXI.

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*Edited by the Secretary, A. C. HAMMOND, Warsaw, Illinois.*

Published by the Society.

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# *REPORT TO THE GOVERNOR.*

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*To His Excellency* RICHARD J. OGLESBY, *Governor of Illinois:*

*I consider it both an honor and pleasure, in compliance with legal requisitions, to submit to you the accompanying Report of the State Horticultural Society for the year 1887.*

*While it is a pleasure to those who have labored long and earnestly for the welfare of this Society, to know that the interest in our work and the demand for our Transactions is annually increasing, it is a source of regret that our limited means will not permit us to publish one-tenth of the Reports that should be distributed among the fruit-growers and farmers of the State.*

*Hoping and believing that the next General Assembly can be made to understand the importance of our work, not only in its relation to fruit-growing, gardening and forest tree-planting, but also its influence upon the rural homes and incidentally upon the moral and political welfare of this great commonwealth.*

*I remain very truly yours,*

*A. C. HAMMOND, Secretary.*

*WARSAW, Jan. 15, 1888.*

JAN 11 1908

# OFFFICERS FOR 1888.

*President* — MILO BARNARD, Manteno.
*Vice-President* — H. M. DUNLAP, Savoy.
*Secretary* — A. C. HAMMOND, Warsaw.
*Treasurer* — H. K. VICKROY, Normal.

## EXECUTIVE BOARD.

MILO BARNARD.....President State Society.
A. C. HAMMOND.....Secretary State Society.
D. W. SCOTT, President Horticultural Society of Northern Illinois.
LEN. SMALL, Vice-President Horticultural Society of Northern Illinois.
C. N. DENNIS, President Horticultural Society of Central Illinois.
D. H. GRAY, Vice-President Horticultural Society of Central Illinois.
J. S. BROWNE, President Horticultural Society of Southern Illinois.
E. A. RIEHL, Vice-President Horticultural Society of Southern Illinois.

## AD-INTERIM COMMITTEES.

The ad-interim work of the Society was placed in the hands of the Presidents of the three District Societies, with authority to appoint, from time to time, such men as may be capable and willing to do the work, with instructions to report to the President, who shall compile the reports and present them at the annual meeting.

## ANNUAL MEETING.

The Annual Meeting for 1888 will be held at Alton, December 11th, 12th and 13th, 1888.

# Standing Committees.

*Orchards*—Allan Cope, Tonti; W. H. LaMonte, Hamilton; F. I. Mann, Gilman.

*The Farmer's Kitchen Garden*—T. B. Harlan, Lewiston; T. E. Goodrich, Cobden.

*Grapes*—J. B. Miller, Anna; G. B. Worthen, Warsaw; L. E. Cunningham, Kankakee.

*Experiment Stations*—Henry Mortimer, Manteno; C. N. Dennis, Hamilton; E. A. Riehl, Alton.

*Strawberries*—D. H. Gray, Elmwood; C. H. Cullimore, Centralia; J. B. Wakeman, Chebanse.

*Stone Fruits*—Caleb Miller, Anna; T. Hallett, Galena; Ira Coe, Quincy.

*Ornamental Planting for Farmers*—John M. Pearson, Godfrey.

*Forestry*—G. W. Minier, Minier.

*Best Six Flowers of Easy Cultivation*—Mrs. J. B. Lathy, Upper Alton.

*Fruit Growing Combined with Farming*—H. M. Dunlap, Savoy.

*Spraying Fruit Trees*—A. C. Hammond, Warsaw.

*Pruning Peach Trees*—E. A. Riehl, Alton.

*New Fruits*—J. Webster, Centralia; A. L. Hay, Jacksonville; L. R. Bancroft, Pontiac.

*Cultivation of Nut-Bearing Trees*—Jacob Hershberger, Salem.

*Raspberries and Blackberries*—H. K. Vickroy, Normal.

*The Catalpa as a Timber Tree on the Prairies*—L. C. Francis, Springfield.

*Impressions of Southern Horticulture*—E. Hollister, Tampa, Florida.

*Fruit Blossoms*—Prof. T. J. Burrill, Champaign.

*Entomology*—Prof. S. A. Forbes, Champaign.

*Farmers' Gates Ajar*—Mrs. A. W. Robinson, Hamilton.

*Window Gardening*—Mrs. O. F. Berry, Carthage.

*Home Adornment*—Mrs. Hattie Cherry, Warsaw.

*Needed Legislation*—C. N. Dennis, Hamilton; E. A. Riehl, Alton; Milo Barnard, Manteno.

The first evening of the meeting has been assigned to the young people, and the following young ladies and gentlemen invited to present short papers on the topics named:

## YOUNG PEOPLE'S SESSION.

*Propagation of Trees and Plants*—C. H. Webster, Centralia; C. E. Dennis, Hamilton.

*Influence of Flowers on the Home*—Miss Bessie Nash, Warsaw; Miss Nellie Riehl, Alton.

*The Farmers' Boys and Girls*—Harry Bryant, Princeton.

*Influence of Horticulture on Young People*—Frank Riehl, Alton; Miss Lulu Gray, Elmwood.

*Influence of Music on the Home*—Miss Emma Dickinson, Hamilton.

*Canning and Preserving Fruits*—Miss Nellie Rockwell, Hamilton.

# CONSTITUTION AND BY-LAWS.

AS AMENDED AT THE ANNUAL MEETING, 1874.

## CONSTITUTION.

I. This Association shall be known as the ILLINOIS STATE HORTICULTURAL SOCIETY.

II. Its object shall be the advancement of the Science of Pomology and the Art of Horticulture.

III. Its members shall consist of Annual members, paying an annual fee of one dollar; of Life members, paying a fee of twenty dollars at one time; and of Honorary members, who shall only be persons of distinguished merit in Horticulture or kindred sciences, who may, by vote, be invited to participate in the privileges of the Society. The wives of members shall be members without fee.

IV. Its officers shall consist of a President, one Vice-President, Secretary, and Treasurer, who shall be elected at the annual meeting, and serve until their successors are chosen; also an Executive Board as hereinafter provided.

V. The affairs of the Society shall be managed by an Executive Board, to consist of the President and Secretary of the Society, and the President and Vice-President from each of the three District Horticultural Societies of the State.

VI. The Society shall hold annual meetings, and publish its transactions annually; *provided*, there are sufficient funds in the treasury to defray the expenses of publication.

VII. The Constitution may be amended at any regular meeting by a two-thirds vote of the members present.

## BY-LAWS.

I. The President shall preside at all meetings of the Society, call the meetings of the Executive Board, and, under its direction, have a general superintendence of the affairs of the Society; and direction of expenditure of money; he shall deliver an annual address upon some subject connected with Horticulture, and shall appoint all special committees unless otherwise ordered.

II. The Vice-President shall preside at the meetings in the absence of the President.

III. The Secretary shall, upon the direction of the Executive Board, conduct the correspondence of the Society, have charge of its books, papers and reports, and prepare its reports for publication; and shall receive for his necessary expenses for postage, stationery, printing, expressage, office rent and salary, such sum as the Executive Board may vote therefor.

IV. The Treasurer shall receive and keep an accurate account of all moneys belonging to the Society, and disburse the same upon the written orders of the President, which he shall retain and file as vouchers; he shall make an annual report to the Society of the receipts and disbursements, which, with the vouchers, shall be referred to a special auditing committee appointed at the annual meeting. Before entering upon his duties he shall give bond to the Society in the sum of five thousand dollars for the faithful performance of his duties; such bond to be approved by the Executive Board.

V. The Executive Board shall perform all the duties required of them by section four of the "Act reorganizing the State Horticultural Society," approved March 24, 1874. They may appoint such standing and other committees as they may deem advisable.

VI. These By-Laws may be altered at any regular meeting by a two-thirds vote of the members present.

AN ACT to reorganize the Illinois State Horticultural Society:

*Be it enacted by the People of the State of Illinois, represented in the General Assembly:*

SECTION 1. That the organization heretofore chartered and aided by appropriations under the name of the Illinois State Horticultural Society, is hereby made and declared a public corporation of the State.

SEC. 2. The Illinois State Horticultural Society shall embrace, as hereinafter provided, three horticultural societies, to be organized in the three horticultural districts of the State, which shall be known as the Horticultural Society of Northern Illinois, now operating in the counties of Bureau, Boone, Cook, Carroll, DuPage, DeKalb, Henry, Grundy, Jo Daviess, Kane, Kendall, Kankakee, Lake, Lee, LaSalle, McHenry, Ogle, Putnam, Rock Island, Stephenson, Whiteside, Winnebago and Will (23); the Horticultural Society of Central Illinois, operating in the counties of Adams, Brown, Cass, Champaign, Christian, Coles, DeWitt, Douglas, Edgar, Fulton, Ford, Iroquois, Hancock, Henderson, Knox, Logan, Livingston, McLean, McDonough, Marshall, Mason, Mercer, Menard, Morgan, Macon, Moultrie, Peoria, Pike, Piatt, Sangamon, Shelby, Schuyler, Scott, Tazewell, Vermilion, Warren and Woodford (38); and the Horticultural Society of Southern Illinois, operating in the counties of Alexander, Bond, Clark, Clay, Crawford, Calhoun, Cumberland, Clinton, Edwards, Effingham, Fayette, Franklin, Green, Gallatin, Hamilton, Hardin, Jasper, Jefferson, Jersey, Jackson, Johnson, Lawrence, Madison, Macoupin, Marion, Monroe, Montgomery, Massac, Perry, Pope, Pulaski, Richland, Randolph, St. Clair, Saline, Union, Wayne, White, Washington, Williamson and Wabash (41).

SEC. 3. The affairs of the Illinois State Horticultural Society shall be managed by an Executive Board, to consist of the President and Secretary of said Society, and the President and one Vice-President from each of the three District Horticultural Societies: *provided*, that the eligible officers now elect of the Illinois State and District Horticultural Societies shall be the first members of the Executive Board created by this act, and shall hold their office until their successors are elected, as hereinafter provided.

SEC. 4. The Executive Board of the Illinois State Horticultural Society shall have the sole care and disposal of all funds that may be apportioned (appropriated) by the State of Illinois to sustain the Illinois State Horticultural Society, and shall expend the same in such manner as in their judgment will best promote the interests of Horticulture and Aboriculture in this State. They shall meet at Springfield on the second Tuesday after the first Monday in January, 1875, and biennially thereafter. They shall render to the Governor of the State a detailed statement of all funds received from the State and all other sources, which statement shall also include all ex-

penditures made by them, and the specific objects in detail for which said sums were expended. They shall make no appropriation without having funds in hand to meet the same, and if any debt is created the members of the Board shall be held severally and jointly liable for the payment of the same, and in no event shall the State of Illinois be held liable or responsible for any debt, obligation or contract made by the Illinois State Horticultural Society or its Executive Board.

SEC. 5. The Illinois State and the three District Horticultural Societies shall hold annual meetings, at which their officers for the ensuing year shall be elected. Within one month after the annual meeting of the District Societies they shall forward to the Secretary of the Executive Board a report of their transactions, including a list of officers elected at such meeting. The Executive Board shall publish annually, at the expense of said Society, a report of its transactions and such other papers as they may deem of value to Horticulture and Arboriculture. Four members of the Executive Board shall constitute a quorum for the transaction of business.

SEC. 6. Members of the several District Societies shall be entitled to all the privileges of the members of the State Society, except that of voting for officers.

SEC. 7. By-laws and rules that do not conflict with the laws of this State may be passed and enforced by the several Societies herein mentioned.

Approved March 24, 1874.

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*The Society was first incorporated February 11, 1857 — two months after its organization.

# List of Members for 1888.

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Auer, Jacob ..... Deer Plains.
Augustine, H ..... Normal.
Austin, A. B..... Downer's Grove.
Browne, J. S..... Alton.
Baldwin Bros. ..... Jacksonville.
Barnard, Milo ..... Kankakee.
Barnard, O. W..... Kankakee.
Barker, John..... Scribner, Neb.
Bryant, A. G..... Princeton.
Bryant, J. P ..... Princeton.
Bryant, Arthur ..... Princeton.
Bryant, L. R..... Princeton.
Bryant, E. W..... Princeton.
Bryant, G. A..... Princeton.
Buckman, Benjamin..... Farmingdale.
Brown, H. D. ..... Hamilton.
Bailey, C..... Shabbona's Grove.
Bubach, J. G..... Princeton.
Brown, E. R..... Elmwood.
Burrill, Prof. T. J..... Champaign.
Beal, L. N..... Mt. Vernon.
Cogswell, C. H..... Virden.
Clarke, S. B..... Ames, Iowa.
Crain, W. R ..... Villa Ridge.
Charpentier, Jules..... Basco.
Cottle, J. R..... Princeton.
Cotta, J. V ..... Nursery.
Cook, H. C..... Princeton.
Carpenter, D. L..... Seneca.
Crooker, L. B..... Mendota.
Dunlap, Henry M..... Savoy.
Dee, Elijah ..... Princeton.
Dennis, C. N. & Son ..... Hamilton.
Delano & Son..... Princeton.
Douglas, E. M ..... Princeton.
Downing, E. O..... Princeton.
French, Prof. G. H ..... Carbondale.
Farwell, R ..... Princeton.
Fell, Charles E..... Heppner, Oregon.
Fitch, J. N ..... Cobden.
Freeman, H. C..... Alto Pass.
Gaston, A. H..... Lacon.
Goodrich, T. E ..... Cobden.
Graves, E. W..... Sandwich.
Griffith, P. H..... Princeton.
Gray, D. H..... Elmwood.
Hansen, M. C..... Ames, Iowa,

Hay, George.....Savannah.
Hay, Leon.....Kankakee.
Hammond, A. C.....Warsaw.
Hall, Dr. Lyman.....Champaign.
Humphrey. Dr. A. G.....Galesburg.
Harris, James, Sr.....Princeton.
Hopkins, J. K.....Princeton.
Herring, Wm. A.....South Allen, Mich.
Huber, T.....Illinois City.
Ingraham, C. T.....Dwight.
Johnson, F. C.....Kishwaukee.
Johnson, James T.....Warsaw.
Kasbeer, J. S.....Princeton.
Kendall, Milo.....Princeton.
Lightner, F. L.....Chester Centre, Iowa.
Lewis, W. T.....Buda.
Lewis, G. M.....Neponset.
Merceret, Frank L.....Willow Hill.
McWhorter, Tyler.....Aledo.
Mesler, W. P.....Cobden.
Mann, F. I.....Gilman.
Minkler, S. G.....Oswego.
Miles, Wm.....Princeton.
Miller, Jacob.....Princeton.
Merrell, F. H.....Avon.
Mason, C. P.....Buda.
Markee, Joseph.....Neponset.
Morris, H. M.....Princeton.
Niel, R. W.....Huey.
Nye, F. J.....Tiskilwa.
Pascharsky, F. W.....Princeton.
Paddock. S. G.....Princeton.
Page, I. D.....Princeton.
Powell, W. W.....Princeton.
Powell, C. R.....Sterling.
Piper, D. J.....Forreston.
Perkins, Joseph.....Van Orin.
Perrine, G. H.....Centralia.
Petterson, Peter.....Sheffield.
Park, James H.....Harristown.
Riehl, E. A.....Alton.
Rockwell, C. B.....Hamilton.
Roots, B. G.....Tamaroa.
Richardson, C. J.....Princeton.
Small, Len.....Kankakee.
Shank, Daniel.....Clayton.
Spaulding. J. B.....Springfield.
Strubler, Phil.....Naperville.
Streator, T. P.....Princeton.
Spake, D. L.....Princeton.
Streator, D. H.....Princeton.
Scott, D. W.....Galena.
Swindler, H. J.....Magnolia.
Soverhill, S. J.....Tiskilwa.
Scott, John.....Princeton.
Stetson, Dr. Ezra.....Neponset.
Simpson, F. L.....Hennepin.
Shugart, T. H.....Princeton.
Thompson, Dr. A. H.....Princeton.

Taylor, Dr. G. W ..... Princeton.
Tucker, E. W ..... Eugene.
Vauter, A. T ..... Macomb.
Vaughn, J. G ..... Odin.
Veeder, P. V ..... Grafton, Cal.
Vickroy, H. K ..... Normal.
Virden, E. R ..... Princeton.
Vandervort, J. M ..... Tiskilwa.
Vandenburg, P. E ..... Jerseyville.
Webster, Jabez ..... Centralia.
Wier, D. B ..... Lacon.
Warfield, B. C ..... Sandoval.
Winter, W. H ..... Princeton.
Walthers, John ..... Princeton.
Wirt, Wm. M ..... Keithsburg
Wirt, G. G ..... Keithsburg.
Woods, Ellis B ..... Van Orin.

HONORARY MEMBERS.

Avery, Henry ..... Burlington, Iowa.
Bryant, Mrs. Arthur ..... Princeton.
Bryant, Mrs. L. R ..... Princeton.
Bryant, Miss Lucy ..... Princeton.
Cotta, Miss Mary ..... Nursery.
Elliott, Mrs. J. H ..... Princeton.
Harrison, Mrs. R. D ..... Princeton.
Herring, W. A ..... South Allen, Mich.
LaMonte, Mrs. J. P ..... Hamilton.
Mesner, Miss Mary ..... Mendota.
Nash, Bessie M ..... Warsaw.
Patterson, Charles ..... Kirksville, Mo.
Reed, Mrs ..... Princeton.
Rockwell, Miss Nellie ..... Hamilton.
Rogers, Mrs. George ..... Warsaw.
Scott, Mrs. John ..... Princeton.
Simons, Mrs. U ..... Princeton.
Stone, Miss Maud ..... Princeton.
Stewart, Miss Alice ..... Hamilton.
Spear, J. A ..... Cedar Falls, Iowa.
Van Deman, H. E ..... Washington, D. C.

# PREMIUM LIST.

The following premiums are offered by the Executive Board, on fruit and other horticultural products, to be exhibited at the annual meeting of the Society, 1888. Entries, except Nos. 7–8, confined to the State.

## APPLES.

### CLASS I.—COLLECTIONS.

| | 1st. | 2d. | 3d. |
|---|---|---|---|
| 1.—Best five varieties winter apples from Northern Illinois, for market | $ 5.00 | $3.00 | $2.00 |
| 2.—Best five varieties winter apples from Central Illinois, for market | 5.00 | 3.00 | 2.00 |
| 3.—Best five varieties winter apples from Southern Illinois, for market | 5.00 | 3.00 | 2.00 |
| 4.—Best three varieties fall apples from Northern Illinois, for market | 2.00 | 1.00 | .50 |
| 5.—Best three varieties fall apples for Central Illinois, for market | 2.00 | 1.00 | .50 |
| 6.—Best three varieties fall apples from Southern Illinois, for market | 2.00 | 1.00 | .50 |

### CLASS II.—NEW FRUITS.

| | 1st. | 2d. | 3d. |
|---|---|---|---|
| 7.—Best plate Seedling, good enough to be recommended | $3.00 | $2.00 | $1.00 |
| 8.—Best plate New Variety, good enough to be recommended | 3.00 | 2.00 | 1.00 |

### CLASS III.—PLATES.

| | 1st. | 2d. | 3d. |
|---|---|---|---|
| 9.—Best plate winter apples from Northern Illinois, for market | $2.00 | $1.00 | $.50 |
| 10.—Best plate winter apples from Central Illinois, for market | 2.00 | 1.00 | .50 |
| 11.—Best plate winter apples from Southern Illinois, for market | 2.00 | 1.00 | .50 |
| 12.—Best plate winter apples from Northern Illinois, for family use | 2.00 | 1.00 | .50 |

| | 1st. | 2d. | 3d. |
|---|---|---|---|
| 13.—Best plate winter apples from Central Illinois, for family use | $2.00 | $1.00 | $ .50 |
| 14.—Best plate winter apples from Southern Illinois, for family use | 2.00 | 1.00 | .50 |
| 15.—Best plate fall apples from Northern Illinois, for family use | 2.00 | 1.00 | .50 |
| 16.—Best plate fall apples from Central Illinois, for family use | 2.00 | 1.00 | .50 |
| 17.—Best plate fall apples from Southern Illinois, for family use | 2.00 | 1.00 | .50 |
| 18.—Best plate winter apples for family use, quality to rule | 2.00 | 1.00 | .50 |
| 19.—Best plate fall apples for family use, quality to rule, | 2.00 | 1.00 | .50 |
| 20.—Best plate Ben Davis | 1.00 | .50 | .25 |
| 21.—Best plate Willow Twig | 1.00 | .50 | .25 |
| 22.—Best plate Rome Beauty | 1.00 | .50 | .25 |
| 23.—Best plate Jonathan | 1.00 | .50 | .25 |
| 24.—Best plate Grimes' Golden | 1.00 | .50 | .25 |
| 25.—Best plate Rawles' Janet | 1.00 | .50 | .25 |
| 26.—Best plate Winesap | 1.00 | .50 | .25 |
| 27.—Best plate Smith's Cider | 1.00 | .50 | .25 |
| 28.—Best plate Yellow Bellflower | 1.00 | .50 | .25 |
| 29.—Best plate Pennock | 1.00 | .50 | .25 |
| 30.—Best plate Gilpin | 1.00 | .50 | .25 |
| 31.—Best plate Domine | 1.00 | .50 | .25 |
| 32.—Best plate Newtown Pippin | 1.00 | .50 | .25 |
| 33.—Best plate Minkler | 1.00 | .50 | .25 |
| 34.—Best plate Rhenish May | 1.00 | .50 | .25 |
| 35.—Best plate Fink | 1.00 | .50 | .25 |
| 36.—Best plate Roman Stem | 1.00 | .50 | .25 |
| 37.—Best plate Wealthy | 1.00 | .50 | .25 |
| 38.—Best plate Hubbardston Nonesuch | 1.00 | .50 | .25 |

## CLASS V.—MISCELLANEOUS.

### PEARS.

| | 1st. | 2d. | 3d. |
|---|---|---|---|
| 39.—Best plate of any and all valuable varieties of pears | $2.00 | $1.00 | $.50 |

### GRAPES.

| | 1st. | 2d. | 3d. |
|---|---|---|---|
| 40.—Best plate of any and all valuable varieties of grapes | $2.00 | $1.00 | $.50 |

### EVAPORATED FRUIT.

| | 1st. | 2d. | 3d. |
|---|---|---|---|
| *41.—Best display of evaporated or dried fruit | $3.00 | $2.00 | $1.00 |

### DISPLAY.

| | 1st. | 2d. | 3d. |
|---|---|---|---|
| 42.—Best display of fruits, appearance of specimens and arrangement of collection to be the standard | $10.00 | $7.00 | $5.00 |

## CLASS VI.—VEGETABLES

| | 1st. | 2d. | 3d. |
|---|---|---|---|
| 43.—Best half peck early potatoes | $2.00 | $1.00 | $.50 |
| 44.—Best half peck potatoes for winter and spring | 2.00 | 1.00 | $.50 |
| †45.—Best half peck onions from seed | 2.00 | 1.00 | .50 |
| 46.—Best half peck onions grown from sets | 2.00 | 1.00 | .50 |
| †47.—Best three heads celery | 2.00 | 1.00 | .50 |
| †48.—Best half peck sweet potatoes | 2.00 | 1.00 | .50 |
| 49.—Best half peck turnips | 1.00 | .50 | .25 |
| 50.—Best half peck beets | 1.00 | .50 | .25 |
| 51.—Best half peck parsnips | 1.00 | .50 | .25 |
| 52.—Best half peck carrots | 1.00 | .50 | .25 |
| 53.—Best winter squash | 1.00 | .50 | .25 |
| 54.—Best head cabbage | 1.00 | .50 | .25 |
| 55.—Best display of salsify | 1.00 | .50 | .25 |
| 56.—Best display of winter radish | 1.00 | .50 | .25 |

## CLASS VII.—CANNED FRUIT.

| | 1st. | 2d. | 3d. |
|---|---|---|---|
| 57.—Best jar strawberries | $1.00 | .75 | .50 |
| 58.—Best jar red raspberries | 1.00 | .75 | .50 |
| 59.—Best jar black raspberries | 1.00 | .75 | .50 |
| 60.—Best jar cherries | 1.00 | .75 | .50 |
| 61.—Best jar plums | 1.00 | .75 | .50 |
| 62.—Best jar blackberries | 1.00 | .75 | .50 |
| 63.—Best jar currants | 1.00 | .75 | .50 |
| 64.—Best jar gooseberries | 1.00 | .75 | .50 |

*All persons entering here must accompany the application, for entry, with a statement of the method of drying or evaporating.

†All persons entering here must accompany the application, for entry, with a statement of their method of growing the various articles.

# RULES OF EXHIBITION.

I. All entries must be in the hands of the Secretary on, or before, the Saturday preceding the meeting. The entry cards will be handed exhibitors the first day of the meeting.

II. All articles must be entered in the name of the grower or manufacturer, and a statement to that effect MUST accompany the application for entry.

III. All exhibits MUST be on the tables by Tuesday, December, 11th, at 7 p. m., properly arranged, and plainly and conspicuously labeled with the name of the fruit and grower and place of growth, and accompanied by a list for the use of the Awarding Committee.

IV. All exhibitors will be required to become members of the Society by the payment of one dollar. This will entitle them to a volume of the transactions and all the privileges of the Society for the coming year.

V. "Plates" of fruit — except grapes — shall consist of four specimens, neither more or less. The same variety may compete for different premiums, and different varieties for the same premium, but separate samples must be furnished for each entry.

VI. Competent committees will be appointed to make the awards, who will be governed by the following

## SPECIAL RULES.

1st. The condition and general appearance of the fruit — which should be in its natural state, not rubbed or polished, nor specked, bruised, wormy nor eroded, with all its parts — stems and calyx-segments — well preserved, not wilted nor shriveled.

2d. The size, in apples and pears, particularly, should be average, and neither overgrown nor small — the specimens should be even in size.

3d. The form should be regular or normal to the variety, and the lot even.

4th. The color and markings, or the surface, to be in character — not blotched nor scabby.

5th. When comparing different varieties, and even the same kind, grown on different soils, the texture and flavor are important elements in coming to a decision.

In Grapes we must consider and compare the form and size of the bunches, the size of the berries, their color, ripeness, flavor and condition.

6th. A fruit that has been named and passed upon by a Horticultural Society shall no longer be considered a "seedling," and a fruit that has been introduced and named ten years shall no longer be considered "new."

7th. All applications for entry of seedlings and new fruits must be accompanied by a full statement of its origin, habit of growth, hardiness and productiveness, or no premium will be awarded.

The Secretary desires to call particular attention to the I, II and III rules of exhibition, as he has been instructed by the Board to strictly enforce them.

# PROCEEDINGS

OF THE

## THIRTY-SECOND ANNUAL MEETING

OF THE

# Illinois State Horticultural Society

HELD AT

## PRINCETON, DECEMBER 13, 14 AND 15, 1887.

---

The Thirty-second Annual Meeting of the Illinois State Horticultural Society convened in Apollo Hall, in the city of Princeton, December 13th, 1887.

At 11 a. m. President Riehl called the house to order and invited the Rev. Mr. Sweet to open the exercises with prayer.

President Riehl—Mayor Thompson will now welcome the Society to the beautiful city of Princeton.

### ADDRESS OF WELCOME.

BY MAYOR THOMPSON.

*Mr. President and Members of the*
*Illinois State Horticultural Society:*

In behalf of our citizens I have the pleasure of welcoming you to our city in this, your thirty-second annual reunion. While this may not be the exact birthplace of your society, it was surely its early cradle and the home of some of its most efficient nurses, and their honored names (especially that of Bryant) are still among those of its active workers. There are portions of our fair land where nature has been lavish in her display of luscious fruits and fragrant flowers, where, touched by the irrigating stream, she wears, so to speak, a perennial horticultural smile. With us, especially in the cultivation of fruits, it is a warfare. Uncongenial soil, pinching

frosts, biting heat, the blasting east wind, with the army of insectivorous pests, have rendered your labors difficult and often discouraging. In the two score years of your history you have achieved valuable results; but there are still problems engaging your earnest attention, especially that of the adaptability of the appropriate varieties of that "king of fruits," the apple, to our diversified soil and climate.

The art of horticulture, technically and narrowly applied to the culture of a garden, has, under your wise administration, expanded its original limits, and now embraces the ornamentation of public parks and school grounds, the beautifying of private lawns, the culture of ornamental trees and the adornment of home; and while agriculture must always remain the foundation of our national prosperity, you, ladies and gentlemen, enter the temple, and with fruit and flowers, make it a thing of beauty as well as strength.

I again welcome you, and in these bleak December days may you pluck the flowers of hospitality and sociability, and reap the fruits of a meeting pleasantly and profitably spent.

## RESPONSE

BY DR. A. G. HUMPHREY, GALESBURG.

*Ladies and Gentlemen, Citizens of Princeton and Members of the Illinois State Horticultural Society:*

Speaking for the President and Members of this Society we gratefully accept the kind hospitality of this city so pleasantly given through the honored Mayor of this beautiful municipality.

The name of your city seems to me to have poetical significance. I am not a linguist, but I should think it meant the "prince of towns." The beautiful site upon which your city is built, and the architectural taste of your buildings, and the neat and clean appearance of the business houses and your homes give force to my poetical illustration. The word horticulture, too, has a poetical significance, especially in the large sense it is now used, as indicated by the gentleman in his beautiful address of welcome. Horticulture, as now understood, not only teaches us how to produce out of the soil the luscious fruits for the use of man, but also how to beautify and adorn our homes, to make them attractive and interesting to visitors, and the most pleasant for ourselves.

My observation convinces me that you are happily situated in a horticultural point of view. Certainly so, if a large portion of the splendid show of fruit in the exhibit above was grown in Northern Illinois soil.

We trust our deliberations will so interest your citizens that after a few years you will take pleasure in again entertaining our Society at its annual session.

The Treasurer submitted the following report, which, on motion was referred to the Executive Board:

## TREASURER'S REPORT.

H. K. VICKROY, Treasurer.

In account with the ILLINOIS STATE HORTICULTURAL SOCIETY.

RECEIPTS.

| | | |
|---|---|---|
| Balance from 1886 | $ 801.88 | |
| Membership fees | 69.00 | |
| State appropriation | 2,000.00 | —$2,870.88 |

DISBURSEMENTS.

| | No. of Order. | | |
|---|---|---|---|
| Dec. 15, 1886—H. K. Vickroy | 251 | $ 42.42 | |
| Dec. 15, 1886—Milo Barnard | 258 | 27.00 | |
| Dec. 15, 1886—Jabez Webster | 259 | 15.18 | |
| Dec. 15, 1886—T. E. Goodrich | 260 | 11.75 | |
| Dec. 15, 1886—C. B. Rockwell | 261 | 15.50 | |
| Dec. 15, 1886—Milo Barnard | 262 | 11.10 | |
| Dec. 15, 1886—J. S. Browne | 263 | 11.00 | |
| Dec. 16 1886—C. B. Rockwell | 264 | 16.00 | |
| Dec. 16, 1886—J. S. Browne | 265 | 8.50 | |
| Dec. 16, 1886—James T. Johnson | 267 | 29.00 | |
| Dec. 16, 1886—Jabez Webster & Son | 268 | 7.00 | |
| Dec. 16, 1886—R. W. Neil | 269 | 12.00 | |
| Dec. 16, 1886—E. A. Riehl | 270 | 27.00 | |
| Dec. 16, 1886—Ed. Blackburn | 271 | 3.00 | |
| Dec. 16, 1886—L. Redden | 272 | 17.00 | |
| Dec. 16, 1886—W. R. Crain | 273 | 29.00 | |
| Dec. 16, 1886—Jacob Auer | 274 | 5.00 | |
| Dec. 16, 1886—E. P. Jones | 275 | 2.50 | |
| Dec. 16, 1886—G. W. Hilliard | 276 | 2.00 | |
| Dec. 16, 1886—A. C. Hammond | 277 | 63.00 | |
| Dec. 16, 1886—L. R. Bryant | 278 | 13.00 | |
| Dec. 16, 1886—R. C. Berry | 279 | 14.00 | |
| Dec. 16, 1886—Albert Halley | 280 | 9.00 | |
| Dec. 16, 1886—Henry Hemple | 281 | 5.50 | |
| Dec. 16, 1886—A. L. Hay | 282 | 1.00 | |
| Dec. 16, 1886—Henry Rehmeyer | 283 | 2.00 | |
| Dec. 16, 1886—S. F. Conner | 284 | 3.00 | |
| Dec. 16, 1886—Arthur Bryant | 285 | 12.75 | |
| Dec. 16, 1886—J. T. Johnson | 286 | 20.00 | |
| Dec. 16, 1886—Bessie M. Nash | 287 | 20.00 | |
| Dec. 16, 1886—C. N. Dennis | 288 | 11.92 | |
| Dec. 16, 1886—J. S. Browne | 289 | 11.45 | |
| Dec. 16, 1886—E. A. Riehl | 290 | 11.50 | —$489.97 |

| | | | |
|---|---|---|---|
| Amount brought forward..... | | | $489.97 |
| Dec. 16, 1886—A. C. Hammond..... | 291 | 15.22 | |
| Dec. 17, 1886—A. C. Hammond..... | 292 | 218.00 | |
| Dec. 17, 1886—T. E. Goodrich ..... | 293 | 9.75 | |
| Dec. 17, 1886—Pacific Hotel..... | 294 | 3.00 | |
| Dec. 24, 1886—L. Redden..... | 295 | 2.00 | |
| Jan. 12, 1887—G. W. Hilliard..... | 296 | 6.20 | |
| Jan. 12, 1887—Leon Hay..... | 297 | 10.00 | |
| Jan. 12, 1887—H. F. Hill..... | 298 | 5.00 | |
| Jan. 12, 1887—T. J. Burrill..... | 299 | 9.10 | |
| Jan. 12, 1887—C. N. Dennis ..... | 300 | 12.80 | |
| Jan. 12, 1887—E. A. Riehl..... | 301 | 8.50 | |
| Jan. 12, 1887—Theo. Goodrich..... | 302 | 20.80 | |
| Jan. 12, 1887—D. Hill..... | 303 | 16.10 | |
| Jan. 12, 1887—A. C. Hammond..... | 304 | 23.20 | |
| Jan. 12, 1887—A. Bryant..... | 305 | 14.13 | |
| Feb. 18, 1887—Phil. Dallam..... | 306 | 21.50 | |
| Feb. 23, 1887—J. W. Franks & Sons..... | 307 | 500.00 | |
| Feb. 23, 1887—Bessie M. Nash..... | 308 | 31.30 | |
| Feb. 24, 1887—J. W. Franks & Sons ..... | 309 | 460.28 | |
| Mch. 17, 1887—S. F. Conner ..... | 310 | 50.00 | |
| Mch. 17, 1887—E. A. Riehl..... | 311 | 8.50 | |
| Mch. 24, 1887—A. C. Hammond..... | 312 | 47.04 | |
| June 1, 1887—A. C. Hammond..... | 313 | 150.00 | |
| Aug. 6, 1887—Dr. Lyman Hall..... | 314 | 50.00 | |
| Sept. 28, 1887—Chas. Holden..... | 315 | 11.90 | |
| Dec. 16, 1886—T. Huber..... | — | 12.00 | |
| Dec. 7, 1887—Phil. Dallam..... | 316 | 22.50 | $2,228.89 |
| Balance ..... | | | $641.99 |

Respectfully submitted,

H. K. VICKROY, *Treasurer.*

H. M. Dunlap—I move that 9 A. M., 1:30 and 7:30 P. M. be made the regular hours of meeting. Motion adopted.

Adjourned.

## TUESDAY AFTERNOON.

The president called the house to order at the appointed time, and requested those having the music in charge to present the promised selection, which was done in a very pleasant and entertaining manner.

### SECRETARY'S REPORT.

BY A. C. HAMMOND, WARSAW.

The past year has been one of peculiar discouragements to the horticulturist, the winter being one of the coldest ever known, and the summer's drouth the severest in the history of the country.

Consequently fruit of all kinds, with the exception of grapes, was nearly a failure. But I will not occupy your time by recounting the failures of the year, but proceed at once to the consideration of the special work of the secretary's office.

Notwithstanding two or three vexatious delays our last report was so far completed as to be mailed to members on the fourth of March. This was probably as early as the book was ever sent out, and considerably in advance of our neighbors — except Michigan — but if there are no unexpected delays, such as waiting for copy or illustrations, the forthcoming volume can be published at an earlier date.

At our last meeting a resolution was passed instructing the Executive Board to ask the Legislature for an appropriation of $4,000 per annum. At the January meeting the Board interviewed the members of the Legislature, and found a very general expression of willingness to grant the amount asked for. Two copies of a bill asking for this sum were therefore drawn up and placed in the hands of Senator Hill, of Murphysboro, and Representative Day, of Jonesboro, who kindly consented to introduce and take charge of them, and President Riehl was instructed to use all honorable means to secure its passage.

About the 20th of February, Mr. Day informed the President and myself that the bill had been made the special order for the 23rd by the Committee on Agriculture, and that he thought it necessary for us to be present. We therefore went before the Committee and made a statement of the work we are doing, how past appropriations had been expended, also of the work we desired to do, and could and would do, if this increased appropriation was granted. After carefully discussing the question, and fully informing themselves in regard to the merits of the bill, they decided by a vote of sixteen to one to recommend its passage.

Being assured by those we supposed understood the situation, that the Committee on Appropriations would be governed largely in their action by that of the Committee on Agriculture, and further, that if any serious opposition should be developed they would secure a postponement of action, and call us before this committee, we left it in their hands. This, however, they failed to do, but had it been done, and the same facts presented that proved so potent with the first committee, I have no doubt they would have recommended its passage instead of cutting it down one-half.

Perhaps it is unnecessary to say, that it was not for lack of interest or any unwillingness to give the subject all the time required, that the President and myself did not spend more time in Springfield, but because of the positive assurance that it was unnecessary.

New fields are opening and inviting us to enter in and possess them. New work is presenting itself every year. The demand for our reports is greater than we have the means to supply, but if we do all we can with our present appropriation I am very confident that the next Legislature will grant us the necessary sum.

I would suggest the appointment at this time of a committee of three on "Needed Legislation," with instructions to report at the next annual meeting.

It has often occurred to me that some means of bringing every portion of the State into a closer relationship with the State Horticultural Society might and should be devised. At present less than half the counties are ever represented at our meetings, or receive a copy of our report; and strange as it may appear, there are tens of thousands of prosperous farmers in the state who do not know of the existence of such an institution as the State Horticultural Society, and thousands of others who suppose that our only work is in the interest of the commercial fruit-grower.

But if they can be made to understand that our primary work is to encourage the planting of family orchards, fruit, vegetable and flower gardens, groves, shelter belts and ornamental trees, and to make our rural homes bright and attractive, they will at once become interested in it.

But the important question is, how can these men be reached? I have given the question some thought, but no satisfactory conclusion has been reached. A plan something like the following is as good as anything I can now suggest. Divide the State into ten districts, with about ten counties in each, and appoint an ad-interim committee of ten members, one in each district, and make it their duty to appoint one or more assistants in each county, who will be expected to report to their principal at stated periods, giving all facts that may be of general interest, such as new and promising varieties of fruit that may come under their observation, successful modes of culture, insect depredations and methods of combating

them, and openings that may present themselves for the organization of local societies. Each member of the committee to make a report to the Society at its annual meeting, and to be paid his necessary expenses for traveling, stationery and postage, not to exceed twenty-five dollars, and each assistant to be an honorary member of the Society and be furnished with a copy of the transactions.

The adoption of this plan would put the Secretary in correspondence with every section of the state, and give him the means of reaching every county with letters, circulars, programmes, books, etc., and in all probability increase our membership largely, and interest many of the 300,000 farmers of the state who know little of our work.

This plan is crude and undigested, but may be suggestive, and if submitted to a committee, something valuable may possibly be evolved from it.

If it should be thought worthy of consideration, it may be that it would be best to adopt the present Congressional districts as a base of operation, and make a committee of twenty to conform to the number thereof.

Would it be to the advantage of the Society and the general interest of horticulture in the state to hold a summer meeting? is a question that is sometimes asked. Many of our neighbors, Michigan, Wisconsin, Missouri and Kansas have tried the plan, and are pleased with it, and I have thought if we could hold a meeting each summer in some new field, it would bring us many new and valuable members and do much to advance the cause in the state. The three District Societies seem to partly occupy the ground, but these summer meetings might be held in connection with their meetings in rotation, which would give all parts of the state equal benefit of the work.

At our winter meetings we are crowded with work, but if a summer meeting was held we might discuss the questions of berry culture, grape, cherry and plum growing, vegetable gardening, floriculture, etc., which would enable us to devote our winter meetings to the questions of apple, pear and peach growing, forestry, ornamental planting, home adornment, entomology, vegetable physiology and other equally important questions.

I throw out these thoughts as suggestive, but am not prepared to make any recommendation.

The question of holding Farmers Institutes in each Congressional District, and, if possible, in every county in the state, is now under consideration by the State Board of Agriculture. But that body, like the Board of Horticulture, finds itself without means to properly carry on this and many other important lines of work, but with commendable energy they have determined to push it forward and desire our Society to furnish speakers to address each meeting on some horticultural topic. I have sent the name of a suitable man

to address each District Institute to the several members of the Board, and hope that when called upon they will promptly respond. That the agricultural and horticultural interests of the state will be promoted by a cordial coöperation of the two Boards in this and various other matters is evident to all who have given the question any thought.

There are other suggestions of interest to the Society that I had purposed to make, but perhaps the above are sufficient for this occasion.

Since my last Annual Report the following orders have been drawn on the Treasurer.

| | |
|---|---|
| Dec. 15, 1886—H. K. Vickroy, commission | $ 42.42 |
| Dec. 15, 1886—Milo Barnard, ad-interim work | 27.00 |
| Dec. 15, 1886—J. Webster, expense as delegate | 15.18 |
| Dec. 15, 1886—T. E. Goodrich, ad-interim work | 11.75 |
| Dec. 15, 1886—C. B. Rockwell, ad-interim work | 15.50 |
| Dec. 15, 1886—Milo Barnard, expense of Board Meeting | 11.10 |
| Dec. 15, 1886—J. S. Browne, expense of Board Meeting | 11.00 |
| Dec. 16, 1886—C. B. Rockwell, premium | 16.00 |
| Dec. 16, 1886—J. S. Browne, premium | 8.50 |
| Dec. 16, 1886—A. C. Hammond, premium | 63.00 |
| Dec. 16, 1886—James T. Johnson, premium | 29.00 |
| Dec. 16, 1886—J. Webster & Son, premium | 7.00 |
| Dec. 16, 1886—R. W. Neil, premium | 12.00 |
| Dec. 16, 1886—E. A. Riehl, premium | 27.00 |
| Dec. 16, 1886—Edward Blackburn, premium | 3.00 |
| Dec. 16, 1886—L. Redden, premium | 17.00 |
| Dec. 16, 1886—W. R. Crain, premium | 29.00 |
| Dec. 16, 1886—Jacob Auer, premium | 5.00 |
| Dec. 16, 1886—E. P. Jones, premium | 2.50 |
| Dec. 16, 1886—G. W. Hilliard, premium | 2.00 |
| Dec. 16, 1886—T. Huber, premium | 12.00 |
| Dec. 16, 1886—L. R. Bryant, premium | 13.00 |
| Dec. 16, 1886—R. C. Berry, premium | 14.00 |
| Dec. 16, 1886—A. Halley, premium | 9.00 |
| Dec. 16, 1886—Henry Hemple, premium | 5.50 |
| Dec. 16, 1886—A. L. Hay, premium | 1.00 |
| Dec. 16, 1886—Henry Rehmeyer, premium | 2.00 |
| Dec. 16, 1886—S. F. Conner, premium | 3.00 |
| Dec. 16, 1886—A. Bryant, expense of Board Meeting | 12.75 |
| Dec. 16, 1886—J. T. Johnson, reporting | 20.00 |
| Dec. 16, 1886—Bessie M. Nash, reporting | 20.00 |
| Dec. 16, 1886—C. N. Dennis, expense of Board Meeting | 11.92 |
| Dec. 16, 1886—J. S. Browne, expense of Board Meeting | 11.45 |
| Dec. 16, 1886—E. A. Riehl, expense as delegate | 11.50 |
| Amount carried forward | $503.07 |

| | | |
|---|---|---|
| | Amount brought forward | $503.07 |
| Dec. 16, 1886 | A. C. Hammond, expense of Board Meeting | 15.22 |
| Dec. 16, 1886 | A. C. Hammond, half year's salary and expense bill | 218.00 |
| Dec. 16, 1886 | T. E. Goodrich, expense of Board Meeting | 9.75 |
| Dec. 16, 1886 | Pacific Hotel, delegate's bill | 3.00 |
| Dec. 24, 1886 | L. Redden, premium | 2.00 |
| Jan. 12, 1887 | Geo. W. Hilliard, expense of Board Meeting | 6.20 |
| Jan. 12, 1887 | Leon Hay, prize essay | 10.00 |
| Jan. 12, 1887 | H. F. Hill, prize essay | 5.00 |
| Jan. 12, 1887 | T. J. Burrill, expense of Board Meeting | 9.10 |
| Jan. 12, 1887 | C. N. Dennis, expense of Board Meeting | 12.80 |
| Jan. 12, 1887 | E. A. Riehl, expense of Board Meeting | 8.50 |
| Jan. 12, 1887 | T. E. Goodrich, expense of Board Meeting | 20.80 |
| Jan. 12, 1887 | D. Hill, expense of Board Meeting | 16.10 |
| Jan. 12, 1887 | A. C. Hammond, Board Meeting and expense bill | 23.20 |
| Jan. 12, 1887 | A. Bryant, expense of Board Meeting | 14.13 |
| Feb. 18, 1887 | Phil. Dallam, printing bill | 21.50 |
| Feb. 23, 1887 | J. W. Franks & Sons, printing | 500.00 |
| Feb. 24, 1887 | Bessie M. Nash, expense reading proof | 31.30 |
| Feb. 24, 1887 | J. W. Franks & Sons, printing | 460.28 |
| Mch. 17, 1887 | Appropriation to Alton Southern Society | 50.00 |
| Mch. 17, 1887 | E. A. Riehl, expense bill | 8.50 |
| Mch. 24, 1887 | A. C. Hammond, cash advanced | 47.04 |
| June 1, 1887 | A. C. Hammond, half year's salary | 150.00 |
| Aug. 10, 1887 | Appropriation to Central Society | 50.00 |
| Sept. 28, 1887 | Chas. Holden, printing badges and badge book | 11.90 |
| Nov. 23, 1887 | Phil. Dallam, printing | 22.50 |
| | Total | $2,228.89 |

The expenditures and receipts of the Secretary's office have been as follows:

EXPENDITURES.

| | |
|---|---|
| Postage on Circulars | $ 1.70 |
| Telegrams | 2.91 |
| Postage on Books | 21.85 |
| Letter Postage | 22.00 |
| Postal Cards | 4.00 |
| Express and Postage on Copy | 1.60 |
| Registered Letters and Packages | .50 |
| Wrapping Paper, Twine, and Boxes for Books | 3.65 |
| Express and Freight on Books | 7.60 |
| Trip to Springfield | 11.10 |
| Trip to Peoria | 13.05 |
| Amount carried forward | $89.97 |

| | |
|---|---|
| Amount brought forward | $89.97 |
| Stationery | 4.68 |
| Express on Exchanges | 12.15 |
| Postage on Premium List | 2.50 |
| Postage on Programmes | 6.00 |
| Incidental Expenses | 3.95 |
| Salary | 300.00 |
| Total | $419.24 |

RECEIPTS.

| | |
|---|---|
| Jan. 12, 1887—Portion of Order 304 | $ 9.60 |
| Mch. 24, 1887—Order 312 | 47.04 |
| —Seventeen Membership Fees | 17.00 |
| June 1, 1887—Order 313 | 150.00 |
| Total | $223.64 |
| Balance due the Secretary | $195.60 |

Mr. H. M. Dunlap—I move that the Secretary's Report be referred to a committee of three. Motion adopted, and H. M. Dunlap, Dr. A. G. Humphrey and C. N. Dennis named as the committee.

## PRESIDENT'S ANNUAL ADDRESS.

BY E. A. RIEHL, ALTON.

Our by-laws say the President shall read an annual address on some horticultural subject, and our Secretary has not forgotten to remind me of it by putting me down on the programme.

Our Society is in as good condition at the present time, financially and otherwise, as at any previous date. Our programmes, the papers read, the discussions, and the exhibitions are better than they were at any previous date. But we should not be content with what we are doing; we have but made a beginning in the good work. There are yet thousands of homes in this State where fruits, flowers and ornamental plantings are wanting, and so long as such is the case there is abundant work for us to do. Even those best posted among us have yet much to learn, and a great deal of experimenting and investigating will have to be done before our art can be considered a science. Our Messrs. Forbes, Burrill, French and others have done excellent work, but much more remains yet to be done,—more than they can hope to accomplish in their lifetimes. There is room for yet other scientific workers, and I think we should do something to have more of that kind of work done. I think this Society could spare some money to start some experiments, and test fruits, and produce new varieties which we need and all are looking for. Could

we not elect or appoint say three members in different parts of the State to receive plants from originators, and test them before being sent out to be tested by the general public. Such a plan it seems to me could be made to work, and would be a great benefit. There are so many new fruits being brought out continually, and we have need of better varieties than any we now have in nearly all kinds of fruits, that the growers are almost compelled to buy these new candidates and test them. If, however, we had such experiment stations of our own, introducers would be compelled to have their bantlings tested and recommended by the experimenters before they could find much of a market for their wares. There are also some fruits that it takes so long a time to properly test that few growers will get all that ought to be tested; the apple for example. We need better apples than we now have, but what one grower feels able and willing to get all the new and promising varieties and test them? All will readily admit that we should get, and so test, all the new or not generally known varieties of apples until we have varieties suited to all sections of the State that will have the quality of the Grimes Golden, the vigor of growth, productiveness, size and shipping qualities of the Ben Davis, and the keeping qualities of the Gilpin. I think we ought to do some active work in that direction, and one or two hundred dollars spent in that way annually will be as likely to pay as any other way in which we could use it. Gradually these stations could, and no doubt would, work into more scientific lines and need greater sums. When that is the case we can no doubt get larger appropriations to properly carry on the work. Let us make a beginning.

We need more members, more young men, with their enthusiasm and vigor. We want more ladies to grace our meetings and take an active part; to that end we should make our sessions as interesting and attractive as possible, and make all realize that it pays to attend our meetings. In union there is strength. In a multitude of council there is wisdom.

The members should take more interest in the work of the Society than they now do, and help the officers with such suggestions as may occur to them from time to time as being calculated to advance the interests and welfare of the Society. None of us are perfect, and there is not a member but has one or more ideas, that if suggested to the Secretary or President, would add to the interest of the meetings. All should feel free to make such suggestions.

A year ago, when we separated and returned to our various homes, the prospect for a favorable season was excellent, but soon after, Old Boreas came with his icy breath and blasted a part of our hopes. Yet later, when gentle spring with her balmy breezes came and caused the fields to become green, and plants, bushes, vines and trees to bud and blossom, giving promise of abundant yields, the horticulturist's hopes rose, and with light step and nimble hands he

planted, pruned and cultivated, with high hopes of receiving his reward. The sun rose higher in the heavens and poured down his hot rays, the refreshing rains that were our due delayed and came not, the earth became scorched, vegetation ceased to grow, insects multiplied and destroyed our crops, and the year that opened with so much promise, closed one of the most disastrous and unprofitable seasons that the fruit growers have experienced for many years. Yet things are not as bad as they seem. The prospects for the coming year are promising, and the failures of the past year may prove blessings in disguise. The scarcity of fruits has no doubt reduced the insects that prey upon them, and future crops will be more free from their attacks. Prices for our products had become very low, so low that but little profit came to the grower. The general scarcity the past season has sent prices way up, and the probability is that future crops will bring better prices than in the past.

The fruit grower is no worse off than others. The farmer, the merchant and the manufacturer all complain of small profits. If we are not getting rich we have at least a good living (if not it is our own fault). No house rent to pay, plenty of fuel to keep warm, an abundance of fruit and vegetables, our own milk, butter and eggs, pleasant homes surrounded with ornamental trees, shrubs and flowers. How many poor mortals are without these, and would think themselves rich if they had what we enjoy. Let us not be discouraged — the time will surely come when the winters will be milder, and timely rains will refresh our growing crops, when we will reap good crops and receive fair prices.

But whatever our financial success may be, we have at least the satisfaction of knowing that our boys and girls are being reared in the pure and intelligent atmosphere prevailing in horticultural homes, and will grow up to be young men and women as happy and healthy, physically, mentally and morally, as can be found in this broad land.

On motion, the President's Address was referred to the Committee on Secretary's Report.

The following reports on Orchards were now read:

## ORCHARDS.

BY H. M. DUNLAP, SAVOY.

The status of our old apple orchards remains about the same. Most of the trees are dead, many in a badly damaged condition and rapidly dying, while but few remain in health. It is, therefore, only a question of a very few years when they will cease to interest us, and will have performed their last duty in the family stove.

We may, therefore, turn our attention to the

ORCHARDS OF THE FUTURE.

There is no doubt but what we, as practical men, should encourage the planting of orchards, but there should be no uncertain sound as to what we should plant, at least in a general way. It would be better that the farmer should plant no fruit trees at present than to plant untried new native, or imported varieties, as the result will in most cases be disastrous to the farmer and to the cause of horticulture. Perhaps, in no business, can swindling be done so successfully and with such impunity as in the nursery business, and the only safety there is in purchasing trees is to go to your nearest reliable nursery or consign your order direct without the intervention of tree agents. That there are many reliable nurserymen goes without saying, but it is also true that some of their methods of doing business through dishonest tree agents, for which they are either directly or indirectly responsible, resulting in "wholesale" frauds in a "retail" way upon the innocent customer, merits anything — except our approbation. Now you are no doubt saying that this is all very well, but where is the remedy for this ? The remedy is with the nurserymen, of course, but we as a society can do something, and are in a measure responsible. We are responsible that we have presented no better guide to the fruit planter. We have been so quick to drop all of the old varieties and so eager to grasp after the new native and Russian varieties that have been put forward, that it is no wonder that the average farmer has been quick to follow our example. With less horticultural knowledge, perhaps he the more readily becomes the easy victim to the conscienceless agent. Instead of buying for experiment he can't have too much of a good thing, so plants his whole orchard to "iron-clad" trees.

Two years ago, at Centralia, I took the position that those varieties that had done the best for us in the past were what we should plant for the future, and until we had fully tested by experimental planting the new varieties presented to us. Since that time I have had no occasion to change that opinion, but on the contrary, I have been more firmly convinced as the new candidates for public favor go to the wall. The hardy "Russian" fails to fill the aching void. It takes years to determine the hardiness and bearing qualities of new native or imported varieties, and while I do not wish to discourage the testing of these varieties in an experimental way, I do wish to condemn the planting of these varieties in the nursery for general distribution, and it becomes the duty of this society to emphasize more emphatically the planting of the best of the old varieties, and to discourage, except in the way stated, the planting of untried varieties.

It is a well-known fact that seedling varieties which have in the original tree proven hardy, fail to maintain that quality when grafted upon other stock, or even when transferred to a warmer

climate and different soil. The Russians have sadly disappointed their friends, as they have blighted badly, and failed to withstand the alternate heat and cold of our winters and the rain and sun of our summers. It seems to me that we have attempted to unravel this problem by commencing at the wrong end, *i. e.*, bringing our varieties from the wrong extreme of climate. It is not extreme steady cold that kills, but the alternation of cold and heat; therefore it is that the Russian, hardy in the steady cold of its native country, fails with us. Instead, therefore, of bringing winter varieties from a northern clime, to become fall apples with us and subject to blight, we will do well to turn our attention to the winter apples of a more southern latitude, which will surely be still better keepers with us, and we have thus only the question of hardiness before us. Let us test the better class of winter apples from the south, such as Picket's Late, Crain's Spice, Johnson's Keeper, Fink, Spark's Late, Cache, etc., and also the apples of Kentucky and Arkansas. I mention the names of some varieties only to call your attention to the fact that there are worthy candidates for favor other than the Russians, and I am firmly convinced that our new varieties will come from the south. To me, it seems, that one way to do this would be for this society to select and publish a list, say ten varieties of apples for Northern, Southern and Central Illinois for family and for market, setting forth the reasons in each case for the selection. There could be a list for general planting, and then a trial list of new varieties also be published. For this purpose I would recommend that a committee be appointed from each of the three sections of the state, and that they report a list at this meeting for discussion.

The drouth in some sections had a disastrous effect on orchards set last spring, but on my own place, out of some eight hundred trees set, I shall lose not more than five per cent. Corn is the best crop I know of in a young orchard, as it protects the trees and shades the ground in the summer. Small grain in an orchard is injurious, as the ground is exposed to the sun by the removal of the crop when shade is most needed. In setting an orchard I would so plant as to have eight rows of corn between the rows of trees. The exact distance would be determined by the width of the corn planter. In a general way I would say plant two rods apart, and upon such land as raises the best crop of corn in a dry season, provided that no water stands on the ground during wet times.

The round and flat-headed borers have been unusually severe in their destructive work the past season, and caused considerable damage to newly planted orchard trees. Going over the trees carefully with knife and wire twice or more times during the year, and first of June and July with a strong mixture of soft-soap and water, applying some to trunk of trees with a swab or brush is the only effectual remedy.

## ORCHARDS.

BY JACOB AUER, DEER PLAINS.

*Mr. President and Members of the*
*Illinois Horticultural Society:*

The following remarks on orchards have reference only to my locality and to apple orchards, as I have not had much experience with other kinds of fruit:

The season of 1887 has been one of great disappointment to the fruit grower, especially has this been the case in the commercial apple orchards of this and adjoining counties. Although we had a large apple crop last season, most of the annual bearers, and such trees that did not bear a crop last year, and were in thrifty condition, had blossoms enough to promise an average crop, but cold, windy and rainy weather set in during blooming season and only a small proportion of fruit set, confined to only a few varieties. Smith's Cider, young trees, though considered a tender variety, matured a full crop in my orchard, Maiden Blush, Rambo and Bellflower matured a few, Jonathan, Willow Twig, and the young Ben Davis promised almost a full crop until June, when the work of the codling moth and curculio became plainly visible; then came the severe drouth, so that from all causes combined, most of the fruit dropped off, and one-half of what remained on the trees until picked were knotty or otherwise damaged. My crop amounted to one hundred barrels, about ten per cent. of an average crop, but very few were so lucky, as the average crop of the county is perhaps less than five per cent. of a crop; the worst failure for many years, so that good apples sold at home for $2.50 per barrel.

Some orchards were also troubled with an insect which perforated the leaves of trees, in some instances almost stripped them which gave them a scorched and sickly appearance.

The fast increase of insects for the last few years, and especially this past season, has convinced orchardists that something must be done to check their ravages. The pasturing of hogs and sheep in an orchard does not seem to be sufficient, even where it is practiced, and some will try spraying, if members of this society who have tried it will give their experience, and can recommend a force-pump adapted for use in large orchards, so that the work can be done quick and effectual. The drouth was especially severe on new plantations, and again demonstrated the necessity of mulching; a large percentage not mulched died, unless watered. I found it necessary to water some of mine in order to save them, but lost some from another cause, the borer. Formerly I used to wash the young trees with diluted soft-soap and crude carbolic acid — about two tablespoons of of the latter to one gallon of wash — but as I did not see much sign of the borer for the last two years, neglected to wash the trees this year, with the above result; shall wash the young trees after this every year to save them from the borer.

Many trees, past their prime, especially on high rolling situations, show the effects of the drouth, and if we should have a very cold winter, will never bear another crop; but the young and vigorous trees have ripened their wood, and go into winter quarters in good condition with an abundance of fruit buds.

So far the Ben Davis is our best paying apple, the tree is hardy, a vigorous grower, an early and annual bearer. Shakelford has been largely planted the last two seasons, but we have to wait and see if it is adapted to this locality. Willow Twig comes next as a paying apple, and on high rolling ground, and while in its prime, pays about as well as Ben Davis; but old trees, and those planted in hollows or creek bottoms, don't color well, and are inclined to bitter-rot. Jonathan is another paying variety, but, at least with me, does best in cultivated ground—the fruit grows larger and better colored. Rome Beauty does not bear well while young, perhaps will do better when older, and Smith's Cider, though a great bearer, is too tender; lost one-fifth of the trees set out eight years ago; and that old favorite, Rawles Janet, has of late years cracked open and rotted whenever we had a rainy spell during September; so there are only a few varieties adapted for a commercial orchard, and we are anxiously waiting for the coming apple that contains the good qualities of the Ben Davis, and Jonathan or Bellflower combined.

## ORCHARDS—A BRIEF EXHORTATION.

BY JAMES T. JOHNSON, WARSAW.

*Mr. President, Ladies and Gentlemen of the Illinois State Horticultural Society:*

What do you expect us to say, or what can we say upon a question so dubious as that of orchards in Illinois, at this time? As a member of your Committee on Orchards for 1887, I have carefully surveyed the field, and what do I behold? Not the thrifty and profitable orchards of our earlier dreams, but ruin upon almost every hand. Not orchards, but wrecks of orchards. In all earnestness, orcharding is (or at least has become of late) a most serious matter, and one to which we must of necessity give more and better attention.

Truly, in such a crisis the eyes of the entire country must be turned upon us, in mingled anxiety, expectation and disgust, and the curious expressions too plainly written upon the faces of my fellow-workers do seem to taunt me now, as if to ask, what are you going to say now? Can you say anything that is new, valuable, or in any degree interesting? And, almost in a frenzy, we ask ourself that selfsame question.

Probably we will be able to say but little, if anything, new. We shall see. And so I ask myself in this unfortunate crisis, with several of my own orchards completely ruined, with the fond hopes of

earlier dreams badly blighted, and with financial prospects no better than fruit prospects, shall I prove unequal to the emergency, and becoming utterly disgusted with the whole orchard business, turn my back upon the pet occupation of my lifetime, and now sit down beneath my crown of gray hairs and suffer myself to become a *croaker?* and the answer comes welling up from my very soul — as it were — never! never! In fact, we cannot, we must not, *we dare not* do this; necessity, duty and even religion forbids it. The world is our garden, and we are told to have a care for it, and to beautify and cultivate it.

In the successful production of nutritious and healthful fruits, the energy, the very courage of the American people are at stake, and we dare not prove recreant to our trust. With the common apple selling all over our country at one dollar and fifty cents per bushel; so very high in price and so scarce in quantity as to become a luxury even less attainable than oranges; with the health and comfort of the toiling millions suffering for want of this important sanitary agent, now so scarce in our markets, that even if all were able to afford this luxury we are not producing them in sufficient quantity to supply their reasonable wants. In such an emergency as this shall we shrink from effort? Dare we even to hesitate? My answer is, never! never!

Do you believe that this is correct reasoning? Do you realize that our population is now increasing at the greatest ratio ever known in any country or in any age of the world's history, with our hundreds of cities (of non-producers) all over this broad land, from Maine to California, and from Manitoba to Mexico, all "booming," doubling and redoubling their populations — with all these millions asking for healthful fruits, there can be but one answer, we must plant more orchards.

It is our duty and our privilege to supply this great demand, and it is possible for us to do so.

We are not telling you now just what varieties to plant, other papers in this volume will no doubt do this. Only this, taking your own experience, and that of others, as to what is most suited to your soil and location, plant liberally, cultivate thoroughly, but carefully and intelligently, and we believe it is yet possible to fill our markets with health-giving fruits of our own growing. Do this, and the hearts of a grateful people will turn to you in gratitude, and what you will probably appreciate even more highly, will be that your pocketbooks will possibly become more plethoric than ever before, as a result of the sale of large crops of handsome and luscious fruits, such as our worthy Secretary, Mr. A. C. Hammond, has already demonstrated in a practical way by his exhibit upon your tables at this meeting, as the result of energy, enterprise and intelligence.

Dr. Humphrey — Mr. Auer names the Ben Davis as the most profitable apple to plant, and Willow as the next. This would be misleading in some sections of the State. In Knox county Ben Davis is nearly worthless. Roman Stem stands at the head of the list, but has the one drawback of ripening too early. Willow Twig is also very valuable. I planted largely of Domine years ago, and it is doing fairly well. The Russians I would touch lightly, as they do not appear to be adapted to our soil and climate, and the quality is unsatisfactory. I think our hot, dry summers have as much to do with the death of fruit trees as the cold winters. I am of the opinion that our coming apples will come from the south, rather than the north.

Mr. Bailey — I came here from New York, thirty years ago, and planted the varieties that succeeded there. The last five years has swept them nearly all out of existence. I can now count on my fingers the varieties that are left. We need not go to Russia, or the South, but if each man will do a little missionary work and look after the seedlings, as well as the old varieties that succeed in his locality, we shall find the apple we want. The great need of the orchardist is a race of hardy, long-lived trees.

H. M. Dunlap — I am not in favor of planting trees that have no recommendations but hardiness. I prefer trees that are productive, even if I replant every ten years. I think we should experiment with southern varieties ; take a northern man south and he will not endure the climate, but bring a southern man north and he will receive new energy and vigor, and I think the same rule will hold good with the apple tree.

J. V. Cotta — Ever since 1855–6, we have been having trouble with our trees; and, looking back over that period, we find that these unfavorable seasons have occurred far too often. I lost a ten-acre orchard, and in every instance the tree was killed by the freezing and rupturing of the inner bark. This seems to indicate that our method of propagation is wrong, and that we must hereafter top-graft on hardy stocks. If propagated in this way, all the old standard varieties can be grown in Northern Illinois. I think some of the Russians are worth testing, but I would not advise any one to rush headlong into them.

Dr. Hall — I wish to speak of a few varieties that have been successful in my orchard. Minkler, Willow, White Winter Pearmain and Michael Henry Pippin have all done well. Stanard has been my most profitable fall variety, the trees have been somewhat injured by overbearing, but now seem to be in good condition for a crop next year.

Mr. Minkler — These questions of progagation and varieties are very important. There is scarcely an apple tree in Northern Illinois twenty years old that is fit to stand. Father Bryant said, many years ago, that twenty or twenty-five years was the limit of the profitable life of an apple tree in the West. We should plant those trees that have done best during the years of disaster, instead of running after new things. Such varieties as Yellow Bellflower and Winesap used to give us good fruit, and I think they will again.

A. H. Gaston — We have some varieties that never fail us, among which are Snow, Willow, Roman Stem and Salome. I have a new seedling, the "Hennepin," which I think is one of the coming apples.

H. M. Dunlap — I am glad to hear this discussion, but wish it was a little more definite. Varieties that are good in one section are worthless in another. In Central Illinois the Stanard is a valuable fall apple, but in Northern Illinois it is a winter apple, but not thought to be desirable.

D. B. Wier — I don't know anything about apples — although I once thought I did — but I think it a mistake to bring new apples from the south. I once had forty-seven varieties sent me from Georgia, and to-day they are all dead but one, a Ben Davis, sent under another name. We have some reliable trees — Roman Stem, Willow, Minkler, Snow, Duchess and Red Astrachan, which we should continue to plant. I know nothing about the Russians, but am testing a number of varieties from Southern France, which appear to be hardy and promising.

F. I. Mann — About the only sound tree in my orchard is the English Golden Russet. The branches of this and the Roman Stem have interlocked and it is difficult to distinguish the fruit.

H. M. Dunlap — I move that a committee be appointed for each of the three horticultural districts of the State, to recommend a

list of ten varieties of apples for profit, for their respective districts, also a list for trial, and that they be instructed to give the reason why they recommend them. The motion was unanimously adopted.

Mr. Dennis—I move that in our discussions no one be allowed to speak more than twice on a question, or to occupy more than three minutes at a time. Motion adopted.

### DISCUSSION CONTINUED.

Mr. Powell—I can endorse the theory advanced by Mr. Cotta, in reference to top-grafting. I have had some experience, and am sure that we can get trees of the grade of hardiness of Ben Davis and Maiden's Blush that will endure our winters, if propagated by this method.

Mr. Bailey—Nothing has been said about planting too close. I planted twenty-four feet apart. The trees have run up very high, and the lower limbs are dead, and the trees generally in poor health.

Mr. Webster—We, in Southern Illinois, have some dead trees but they have not been destroyed by cold. Over-bearing, drouth and insect depradations are the great drawbacks with us. Twenty-five years is the outside limit of the profitable life of an orchard. Top-grafting may be advisable in the north, but with us this mode of propagation makes short lived trees. The codling moth is our worst enemy; we raise apples by tens of thousands of bushels, but this moth causes great loss. We have come to the conclusion that we must spray our trees, and many of our orchardists will try it next season. The cultivation of orchards is an important question. One of my customers sowed his young orchard to oats against my advice, and killed all his trees.

## THE THREE MOST IMPORTANT VEGETABLES FOR THE HOME GARDEN.

BY JABEZ WEBSTER, CENTRALIA.

*Mr. President, Ladies and Gentlemen:*

I have been called upon to present to you some thoughts upon this subject, at your thirty-second annual meeting.

What I may say will be from the standpoint of the section where I live, and may not be applicable to distant points where different conditions exist.

In our section, to grow vegetables of most any kind successfully, excepting, perhaps, two kinds, tomatoes and sweet potatoes, manure must be applied and incorporated in the soil with a lavish and liberal hand; this is difficult and expensive to obtain; we have long since past the period when the stables were moved to get away from the manure — we have to pay for it now all it is worth, and often more, but cannot raise good vegetables without it.

The wording of the question I have to present you is rather ambiguous — the three most important vegetables for the home garden, is a question in which we may find plenty of room to differ. Variety has much to do with our health. No home should be without its kitchen garden, where there are vegetables in variety to supply the table the whole year, but as some varieties are difficult to raise they will necessarily have to be purchased from those who are experts and are fixed to grow them. Yet there are very many families that are very poorly supplied with vegetables that are of the earliest and most simple to raise, and of these the potato stands first in importance, in a commercial point of view as well as a life-sustaining, health-giving vegetable food, for man and beast.

I do not claim to be an expert in vegetable gardening, yet I do pride myself in the fact that I have had a wide and varied experience in the different branches of gardening, extending back forty years.

The potato, which, in its wild state, is found in the mountains and valleys of the Rio Grande, is found for sale in endless varieties in its improved state in every city, town and village throughout the civilized world. Who ever heard of a family being troubled with scurvy and the various skin diseases where potatoes were abundant and plentifully used as a diet. Potatoes can be grown successfully over a larger space of God's foot-stool than perhaps any other vegetable. Fair crops of potatoes may be grown without manure, on pasture or clover sod, plowed under in October and planted in early spring; but we realize the fact that on heavy clay soil no crop will pay better for liberal manuring than potatoes, excepting, perhaps, asparagus.

I know no better way to procure a crop of potatoes on the farm or in the village lot, than to plow your ground deep and harrow the first days it will do to plow in early spring; mark out your furrows three feet apart on your prepared ground and four inches deep; spread your manure quite thickly in the furrow at the rate of ten two-horse loads per half acre; drop the potatoes in the furrow on the manure ten inches apart; cover with plow. The ground should be harrowed in eight days, to keep the weeds in check until the potatoes show themselves, they should then be hoed at once, and then run the cultivator between the rows of ten, enough to keep the ground loose and to keep the weeds down. About the time the first bloom appears the soil should be laid up on each side to form a slight ridge to

catch the rains. This may be done the best with a single shovel plow or a small one-horse plow. The relative merits of planting whole or cut potatoes is yet undecided with very many. The bes rule in my experience is to pay no attention to the moon, but be governed by common sense. Cut the large sets so as to leave sufficient substance to the plant, remembering he that soweth sparingly as a rule will reap, also, sparingly. The varieties of potatoes are legion, and still they come. Each individual planter must determine and decide which is best for his soil and latitude.

Asparagus is fast becoming one of the great staple vegetables in city and country, and so it should be. Every possessor of a home and a square rod of ground should have a bed of this healthy, easily procured vegetable. Asparagus being a hardy perennial plant and a gross feeder requires an abundance of manure. A permanent bed in the garden in town may be made by trenching to the depth of two feet or more, and mixing each layer of soil with four inches of well-rotted stable manure. Permanent beds can be made at a trifling expense on most every farm. This may be done by opening out a deep and wide furrow on the center of the spot where you desire to plant. It is best to have one or more long continuous rows convenient to your wagon drive, where manure can be applied from the wagon drive without going on and over the bed when wet, having your furrow made with a two-horse plow — wide and deep as two heavy horses can pull, following in the bottom of the furrow with subsoil, then scatter in the bottom of the furrow full four inches of rotten manure; close up this furrow, covering the manure, having now two furrows to fill with manure as before; so continue until you get your bed the desired width and length. For a bed of three long rows a bed of eleven feet wide should be prepared. A very good distance to plant is three feet four inches by fourteen inches in the row; where ground is trenched and manured heavily, two and one-half by one foot. We recommend cultivating asparagus with a horse. The wider distance requires about five hundred plants to an acre. Two-year-old plants can be obtained from most gardeners and nurserymen at fifty cents per hundred or four dollars per thousand. The crown of asparagus should be three inches below the surface level; not necessarily best to cover that depth in all soils and situations when planting, but as the plant grows it can be filled up and leveled until that depth of rich soil is above the crown. Manure can be piled on during the fall or first winter months to the depth of two or more inches annually. Thus the productiveness may be kept up from twenty to fifty or more years. It should be cultivated thoroughly during the cutting season and once more after. It may be cut from April till July, and a part of the bed may be let grow up in early spring and be mown off with a scythe the last week in August, cultivated and cut daily through September and a part of October.

Third in importance. So little known and esteemed thirty years ago, some would say, is the tomato; but we would pass it and point to the humble lettuce; its cultivation so easy, its freedom from insect enemies and disease, manageable in the hands of the unskilled, makes it a real garden treasure. Every lover of a home garden, except the northern regions, can have it in April, yet how comparatively few have it until May. In the early spring it loves to grow in a warm, sunny, sheltered spot; a tiny bed, two and one-half feet wide by seven feet long, may be sown the first day of February or the first days in March. Set upon edge, around your lettuce bed, pieces of fence plank, covering it with boards in stormy, bad weather, or better still with some old window sash. If the bed is rich and well prepared, your tiny lettuce bed will soon well repay you for the trouble and care with a bountiful supply of salad. Very many gardens near our large cities make a specialty of raising this wholesome vegetable, and find ready sale for it almost the entire year. Large greenhouses are devoted to its cultivation in the winter months, and very many families make, from a very small spot of ground, a very comfortable income. The Early Curled Selesia is one of the very best for early sowing. Lettuce grown to head, as does cabbage, requires to be sown the last of September; they are then planted into cold frames, about two inches apart, and kept in a semi-dormant state until April. Lettuce when thus grown will stand fifteen to twenty degrees of cold. In early spring plants of lettuce thus kept can be planted about one foot apart, and under favorable conditions will well repay every lover of a home garden to provide his family with a supply of lettuce. To love and enjoy home is to constantly cultivate a love and taste for the good things in the vegetable world the Creator has placed around us. To watch their growth and development, and to interest ourselves and families in all that pertains to the occupation of a home garden, is worthy of our serious consideration.

H. K. Vickroy — I think Mr. Webster recommends planting asparagus too close, I would plant four feet apart as the cultivation can be more readily done. Do you cut above or below ground?

J. Webster — There is a demand for both the green and the blanched, I am not sure which is best. I think asparagus is to become one of the most popular vegetables. Like all vegetable life it must have a season of rest. After the cutting season is over the tops should not be disturbed.

The President announced the following committees:

*Awarding Committees* — Class I and III.—J. Webster, J. V. Cotta and Len. Small.

CLASS II—H. E. VanDeman, Milo Barnard and H. M. Dunlap.

CLASS IV—H. E. VanDeman, Chas. Patterson, S. G. Minkler.

CLASS V AND VI—T. E. Goodrich, H. D. Brown, Benj. Buckman.

*Premiums Nos. 36 and 37*—H. M. Dunlap, E. W. Graves, B. C. Warfield.

*On President's Address and Secretary's Report*—Dr. A. G. Humphrey, H. M. Dunlap and C. N. Dennis.

*Final Resolutions*—C. N. Dennis and F. I. Mann.

*Fruit Lists*—Northern Illinois—S. G. Minkler, Milo Barnard, Arthur Bryant.

Central Illinois—H. D. Brown, H. M. Dunlap, Benj. Buckman.

Southern Illinois—J. Webster, J. N. Fitch, J. S. Browne.

Adjourned.

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## TUESDAY EVENING.

The evening session was opened with music. Two cornets, played by Messrs. E. W. Graves, of Sandwich, and F. I. Mann, of Gilman, with piano accompaniment. They were encored by the audience which showed their appreciation of the music.

### THE ORNAMENTATION OF THE YARDS OF PUBLIC SCHOOL HOUSES.

BY DR. RICHARD EDWARDS, SPRINGFIELD.

If any one has come to this meeting with the expectation of hearing some new reason for the cultivation of trees either in school yards or elsewhere, he will be likely to be disappointed. The subject has been too much discussed for that. If it is true as a general proposition, as holy writ declares there is nothing new under the sun, it is certainly true in this particular case. In the State of Illinois we have been reminded from the beginning of the value of trees. Here we cannot plead, as is done in some localities, that the necessity of clearing the land from forests in order to make it fit for agriculture, has served to deaden within us the love of trees. From the very beginning our circumstances have served to awaken within us a hunger and a thirst for these beautifiers of the earth. And

one consequence has been that the subject has been continually discussed. I remember that more than twenty-five years ago, when I first became an inhabitant of these prairies, perhaps the first sound that greeted my ear was a plea for tree culture, and it bore evidence even then of being an old story.

I stand before you then with no hope of uttering an original thought or presenting a new argument. There have been men engaged in this work who have devoted themselves to it not only with intelligence and wisdom, but also with a resistless enthusiasm. Some of these men I vividly recall. They have given the subject a most earnest and laborious study. Their hearts were in it. They had themselves conducted experiments in order to learn how most wisely and effectually to plant and grow trees, and they had eagerly listened to the results of the experiments of others. I feel that in attempting to speak upon this subject at this time, I am but feebly treading in the wake of these worthy pioneers.

Why should trees be planted within the enclosures of school houses? For the same reason that impels us to plant trees anywhere. The only difference that we can note, is that in the case of school yards these reasons are intensified. As a rule the benefit derived from trees will be more permanently and more effectually felt if enjoyed by children than if enjoyed by adults.

But what are the advantages of tree planting generally considered? What are our needs in these days in this part of our country? I see it frequently stated that our streams are drying up. We are told that formerly the Illinois River was navigable to La Salle nearly the year round. Now it is as much as ever that we can say it is navigable at all. Smaller streams which were formerly so marked a feature of the prairie landscape, have been substantially obliterated. A process seems to be going on similar to that which has taken place in certain historic regions of the old world. In these ancient localities, lands that two thousand years ago teemed with a dense population, which was abundantly fed from their products, are to-day a dreary desert. In this year of unparalleled drouth, we, in Illinois, have been startled by the terrible possibilities. Our very soil is washing away, for when moisture comes to us, it often comes in a sudden flood, and instead of saturating the earth, it suddenly rushes away as if it found itself an unwelcome guest. What does all this forebode? This being the resistless tendency of to-day, what may we expect for the future?

And we are told that these changes are largely due to the distruction of the forests as well as other forms of vegetation. Trees, even if they do not increase the rainfall, as some think they do, certainly equalize it. The rain that falls in a forest does not rush away in a momentary torrent. The roots of trees also hold the soil in its place on bluffs and hillsides. A forest both irrigates and fertilizes.

Trees also furnish a protection against the violence of storms.

They mitigate against the fierceness of destructive winds. It is even suggested by some that if our prairies in Illinois were well protected by timber belts, we might still be growing some of the fruits that we have long since ceased to produce.

Trees also appeal to the love of the beauty within us. The naked expanse of an arid plain is not an attractive sight. It rather repels. But a stately forest, especially when in full foliage, and even a single tree, has about it a charm. We love to look upon it. We love to rest under its shade in summer, and to be sheltered by it in winter. And if it was not a mistake in the Creator to bestow upon mankind this love of the beautiful, we must concede that it ought to be cultivated, educated, developed. And this faculty like every other that we possess is educated by the presence of its proper objects. Our conception of the beautiful is not to be developed by the presence of things that are ugly. The contemplation of naked sand-hills and monotonous dunes does not make the mind more sensitive to the beautiful or more appreciative of it.

These benefits resulting from tree planting are appreciated by adults. They are matters of scientific investigation. In some respects it requires a matured mind to understand them. But they can also be very largely appreciated by children. In some respects much more fully by children than by adults. When we speak of an influence exerted upon mind, that is an educating influence we are speaking of something that has special reference to childhood. If trees are a means of education to the human being they are specially adapted to the child, for it is the child that is specially susceptible to education.

There are three ways in which trees may contribute to the welfare of children at school. The first of these is, the furnishing of a harmless and pure pleasure. There has been a theory that life is successful in proportion as it is painful, that pleasure in every form is to be shunned because its tendency is evil. But this theory must be pronounced false. Its falsity is proved by the very world in which we live. If this theory were true, the Creator must have strangely forgotten himself when he clothed the earth with verdure, when he adorned the trees with blossoms, when he filled the air with joyous sounds. The truth is, that man is invited to just as much enjoyment as he will fit himself for. All nature is full of genial influences, influences calculated to awaken the purest pleasure. And this for the adult as well as for the child, for him who comes forth from the moral conflict scarred and defeated. And if this is true of the situation in which the mass of mankind are placed, it ought to be doubly true of the environments of childhood. It is therefore a high duty incumbent upon every one who has any control over a child's surroundings, to make these surroundings as pleasant as possible. Let them be such as to awaken joy in the hearts of the little ones. Let them be prepared for whatever trials life may have

in store for them by as joyous an experience as their circumstances will permit. Let the sunshine fall upon them, and develop within them strong and wholesome qualities that will be so much needed in after life.

The second way is by contributing to the child's health. Everything that helps to develop sound, wholesome bodies, is at this stage of life inexpressibly valuable. If the child reaches maturity with a diseased or enfeebled physical frame, he is handicapped in the race of life. A healthy body is the substratum of all great achievements. And if the shelter of the school house yard from the fierce rays of the sun in summer, and from the violent blasts of the wind in winter, does not tend to promote sound health, where shall we look for such tendency? One of the severest trials to health in this continental climate is found in the extremes of temperature and moisture and air movements. Our ailments are thought to arise largely from the sudden changes to which we are subjected. But the effect of trees is to equalize these forces. The intense heat, the extreme cold, the violent blasts — they are all mitigated, tempered by the presence of trees. Perhaps it may be said that in no part of the world is this equalizing influence in climate more needed than in the Mississippi valley. Our averages here are all admirable — the average temperature, the average rain fall, the average wind force — they are all very near what the human system requires for its best development. Our dangers arise from the extremes in these particulars. And here the trees help us. They supply the very element in which we are most wanting.

There are other ways in which trees contribute to the health of young and old. In the absorption of certain noxious gases, in the giving forth of health inspiring oxygen, they help to bring about the same important end. But I leave these points for the scientific experts — for the men to whom these things are more familiar than they are to the mass of people.

The trees in a school yard may also be made an effective and very useful means of education. By the theory of pedagogy now commonly accepted, one of the early needs of children is the cultivation of the senses, the training of eye and ear and feeling. Now trees present wonderful opportunities for the training of these powers. Their great diversities, their points of agreement, the almost infinite variety in the forms of leaves, the number of shades of color in leaf and flower and bark, the arrangement and direction of branches, the different forms of trunk, the general contour of the branches, the arrangement of moss on the bark, the structure of flowers, the form and color and quality of fruit — each of these is an education by itself when rightly used; and unitedly, they may be truly said to furnish opportunity for a liberal culture. For it would be a great waste of opportunity to surround school houses with trees and then fail to use them in the development of the children's minds. Prof.

Brewer, of Yale College, says: "The ignorance of city children in regard to natural objects which are growing all about them may seem incredulous. I have just talked with city young men from prominent families who could not give the names of three kinds of trees. I can pick out college students to-day who do not know the difference between wheat and oats or rye and barley." This is certainly an inexcusable defect. How can it be remedied? The answer is, by the study of the actual objects. And I wish to say for myself that the little that I know about trees was learned by actual close contact with them in early life. The trees that grow in northern Ohio, the white oak, the black oak, the beech, the chestnut, the hard and soft maples, as we called them, and some others, I may say that I know as thoroughly as I know anything. When in some of the Illinois groves I fall in with a little specimen of the iron wood, it seems like meeting an old friend. But of other trees, I have to this day very confused ideas. What I learned, I learned not through the agency of books, but by sense perception. And it would be a great gain if from the trees in our school yards the pupils could acquire a thorough acquaintance with some at least of our useful and ornamental trees; a knowledge that should be like the knowledge one has of his intimate friend; a knowledge involving a multitude of elements, but still instantaneous in its operation.

This training of the sense perception is a very important part of education. In how many cases it has been neglected. Multitudes of adults there are who fail to see, in any adequate sense, the objects that come before them. If in childhood and youth we had become accustomed to thoughtful observation, our habit in this respect would have been entirely different. Prof. Louis Agassiz, carried by a railroad train at the rate of twenty-five miles an hour, had his observing powers so thoroughly trained that he could recognize a particular plant by the roadside as he rushed along. To other observers there was nothing but a blurred surface of greenish earth. We fail to discern a tithe of the beauty there is in this world because our powers of observation have not been schooled by exercise.

I think that from trees in the school enclosure, the child may secure, in the first place, scientific culture. By such observations as they can make, it is that the botanists acquire their knowledge, and deduce their scientific skill. The fundamental thing in this important science of botany, is the establishment of the facts. The generalization comes later. And we are somewhat addicted to the habit of generalizing before we have fully mastered the facts. This habit is a vicious one, and the study of trees, as they grow and as they actually are, would help us to overcome it. Thus, from a reasonable and a natural use of these surroundings of the school house, children may derive the basis of an education most thoroughly scientific.

But this is not all, the æsthetic faculties would also be trained by such study. What is the standard of beauty in this world? We say we find it exhibited in the fine arts, in sculpture, in painting, in architecture. We look upon some imposing building with Ionic or Corinthian capitals and we pronounce it beautiful. We say the same thing of a Grecian statue, or of a painting by one of the great masters. But these are none of them originals. So far as they have any beauty at all, they are copies,—copies of what God has already formed in nature. A statue, however smoothly chiselled, would be pronounced a deformity if it did not actually represent the human body. The acanthus leaves of the Corinthian capitol is perfect just in so far as it is a representation of the leaf as it grows on the acanthus plant. And the same thing is true in painting. The pattern of beauty is in God's creation and not in man's. Let the child then study trees. Here he may find lavishly displayed in the forms and colors of leaf, and blossom, and branch, and trunk, the originals of so much beauty that delights man. Let him go to the fountain head of beauty both of form and color.

All the objects that have been named,—pleasure, health, education,—can be more fully attained by active coöperation on the part of the pupils in the planting and care of trees. I know that the burdens laid upon the teacher are many. The demands made upon him are often unreasonable. And I certainly have no desire to add to these burdens or to multiply these demands. But I believe that every teacher will find himself assisted in the discipline of his school, and also in his work of instruction by interesting his pupils in this matter of tree planting. I commend this then to every teacher as a means of helping forward the work in which he is engaged. Let the children become interested in the planting of trees. Let them, to some extent, do the work with their own hands so that the enterprise shall, in some sense, be considered their own. Let them watch the growth of what they have planted. Let them feel a responsibility for the success of the enterprise. As far as possible let their feelings become awakened. The effect upon them will be in all respects improving,—physically, intellectually, morally, æsthetically. Of course all this will require some care on the part of the teacher, but it will be care well bestowed. If the purpose of school education is the development of manhood and womanhood, these efforts will contribute to that result powerfully.

In this connection let me commend to all teachers and school officers the observance of the day known as "Arbor Day." By an act of the legislature, approved June 10, 1887, it is made the duty of the governor to "designate every spring, by an official proclamation, a day to be known as Arbor Day, which is to be observed throughout the State as a day for planting trees, shrubs and vines, about the homes and along the highways, and about the public grounds within this State." Now surely the grounds about school-

houses are "public grounds," and come fully within the scope of this act of the legislature. I hope therefore that when this proclamation is issued every teacher and school officer will feel that it is addressed to him. Let there be a practical response to this proclamation wherever there is a group of children assembled for schooling. Let the day be emphatically the children's day. Let it be so well employed in planting trees, that a hundred years hence these prairies may exhibit the pleasing and the profitable results of the exercise.

It may be objected that trees planted about a school-house are liable to be destroyed by children in their rough plays, and that therefore the planting would be of no avail. It is in part to obviate this difficulty, to overcome this destructive tendency that the planting is recommended. Undoubtedly in every child there is something of the savage, something of a tendency to destroy merely for the sake of destroying. There is also much of the spirit of carelessness and disinclination to self-control. But these are the very tendencies that ought to be overcome in the process of education. It is for this, in a large measure, that schools are instituted. We do not wish entirely to eradicate the destructive tendency in children or adults, for there are some things in this world that ought to be destroyed. But our education ought to teach a discrimination in this respect. It ought to enable children to distinguish between that which ought to be preserved and that which ought to be destroyed. And it must go further than this. It must engender in the mind of the child a care for those things which are worthy of preservation. Education ought to overcome the recklessness of childhood and youth and to substitute for it an enlightened sense of responsibility. And this result the care of trees will help to accomplish. The boy who, in order to preserve a tree or plant, will restrain his playful impulses, that boy is learning one of the highest lessons in life. He is training himself to be a ruler among the storms and passions that may afterwards assail him. I say that if we mean to make anything at all of our schools worth thinking about we ought to include among the objects of schooling this development of the self-regulating faculty. The objection then to tree planting, that the school children may destroy them, turns out to be no objection at all. It is an additional reason in favor of the practice.

Allow me to add one other reason, very weighty, as it seems to me, why children should participate in the planting and cultivation of trees. It is this. The results of such labor do not appear at once. It requires long waiting. From his interest in this enterprise the child learns that all worthy rewards are not immediately secured, that the present must provide for the distant future. In short, he learns the lesson of foresight. And are we all prepared to value this lesson as it deserves? Suppose we were asked to state the most conspicuous difference between the savage and the civilized

man. May it not be true that we should find it in the presence or the absence of this habit of mind? The savage kills his game to-day and eats it to-day. He basks in the sunshine during the summer and shrivels with cold during the winter. If the thought of the future comes to him at all it does not impel him, in any large measure, to make preparation for it. The civilized man on the contrary, uses the sunshine of summer as a preparation for the storms of winter. He lays up treasures for the time to come. And just in that proportion in which he is faithful in doing this, just in that proportion is he civilized or enlightened. Think how this habit of mind ennobles men! The man of foresight is master, not only of to-day, but of the time to come. Changing seasons hurt him not. The winter storms fall harmless upon him. And the reason is, that long ago, by his faithful foresight, he has enabled himself to neutralize their power.

Now surely this is one of the lessons that children need to learn. The mastery of it will elevated them in the scale of being — will make them be worth more in the universe of God than they otherwise would be. Let them, therefore, plant and cultivate trees. And let them wait with a manly, yea, a god-like patience for their growth and development.

Of course the practical question will arise here, what trees to plant, just how to plant them. I see that the State of Connecticut by a recent act of the legislature offers a premium for the planting and cultivating of the chestnut, hickory, ash, white oak, sugar maple, European larch, white pine, black walnut, tulip and spruce. I do not claim to be an expert in this matter, but I confess that this list seems to me an admirable one. These trees are fine specimens. They combine many excellencies. But of course this list is exceedingly limited. My friends, Mr. Bryant, of Princeton, and Mr. Edwards, of Mendota, and others, could make out a much larger list. The truth is, that our defect in this State is not a lack of knowledge as to what trees it were wise to plant, but it is a lack of efficient faith in any planting. What we need is an awakening to the importance of the subject.

## ORNAMENTATION OF PUBLIC SCHOOL GROUNDS.

BY SAMUEL EDWARDS, MENDOTA.

At the commencement of a lecture by John B. Gough, he said "the title announced was nothing more than a peg to hang one's hat on," but he branched out much more widely from the text than did President Cleveland in his last message.

Passing nineteen-twentieths of the school-houses in this section of country, do we in their surroundings, see anything to make us wonder that our people are so slow to plant trees for shelter, profit or ornament? That our fruits are sent us from California

and other States, cabbages from Holland, onions from Bermuda and Spain, flowers from Chicago? While ubiquitous tree peddlers gather in the shekels from slaughtered innocents, who are furnished by him with what purports to be the latest and best variety of White Grape, Clematis or Tree Rose, at three to five dollars each. Russian apple, or mulberry trees, hardy, and to produce an abundance of luscious flavored fruit, at fifty cents to one dollar and fifty cents per tree — an especial favor, as assurance is given that the home nurseryman cannot supply them.

For "cheek" they are without a rival in the *genus homo*, and in my opinion are one of the greatest arguments that can be advanced for the education of the young in rudiments of practical horticulture. Many, if not most of them, have no practical knowledge of the business, yet are ever ready to disparage those whose lives have been spent in active service, and give advice to their customers — which controls the action of the masses, far more than the counsels of horticultural societies.

There is no work to which children take more kindly than in the garden, and none is more repulsive to most adults who were not accustomed to it in early life. In how many cases the entire care of not only the flowers, but the vegetable garden, is left to the women of the household, while the long list of luscious fruits, — fruits so easily grown,— to be enjoyed in profusion by any one, — even on a village lot, are looked upon as luxuries, and bought on rare occasions.

The generous provision made by the federal government for donating homes under the timber culture act, is familiar to all. From considerable inquiry made of frontier settlers, I am satisfied that very many who have titles under it are not justly entitled to them, and are ignorant of the proper manner of doing the work.

In France, Austria and Sweden there are thousands of schools with gardens attached to them, under the care of a properly qualified teacher. In Vienna, where Dr. Schwab started the movement, the authorities appropriated land and money rather reluctantly for the experiment, and three years later, willingly and enthusiastically doubled the land in order that all the children of the city might come under its cheering, refining influences. In Cambridge, Mass., the experiment has been tried with most gratifying results. Dr. Northrop, and other prominent educators of Connecticut, are advocating tree planting by school children.

Good work has been done at the Industrial University, Champaign, and Normal University, at Normal, but as this is work with which all should be familiar, it should be taught practically in all our schools.

As to details for decorating school grounds, it is left in the hands of my abler colleague, and with the carrying out of the work herein suggested there need be no fear but they will be greatly improved.

While a few individuals are permitted to view from mountain top the finished landscape, clothed in all its possible wealth of material products and æsthetic loveliness, putting forth their best efforts for a realization of their ideal, is it not too true that the masses, for want of proper education, rob themselves of happiness too pure and exalted to be measured in value by sordid gold?

A. H. Gaston—Arbor Day should be made one of our most important holidays. Teach the children and encourage the older people to plant trees. Plant them about the house, plant them by the roadside, plant them in the school-yard, and they will remain living monuments long after the hand that planted them has crumbled back to dust. I celebrated my sixtieth birthday by planting a walnut, that will probably live long after I am forgotten. The Legislature should make an appropriation for the special purpose of planting and otherwise ornamenting school grounds.

Mr. Patterson, of Missouri—In Missouri it has been found impracticable to celebrate the same day in all parts of the State. The proper time for planting in the north is too late for the south.

Dr. Edwards—I think the Governor will be obliged to this Society if they will designate the proper date in each of the three districts, Northern, Central and Southern, for this work. I expect to issue a circular to county superintendents in the spring in relation to this matter, and shall be glad to receive any suggestions this Society may desire to make.

Dr. Humphrey—The idea of the educational influence of planting and ornamenting the school-yard is important, but the economic question of tree planting is equally so, and this Society should keep it constantly before the people. I move that the designation of the proper date for Arbor Day be referred to the Committees on Fruit Lists for the three horticultural divisions of the State.

Motion adopted.

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## WEDNESDAY MORNING.

At the appointed hour the President called the house to order, and invited the Rev. Mr. McGinnis to invoke the divine blessing.

The election of officers was now taken up and resulted as follows:

*President*—Milo Barnard, Manteno.

*Vice-President*—H. M. Dunlap, Savoy.

*Secretary*—A. C. Hammond, Warsaw.

*Treasurer*—H. K. Vickroy, Normal.

President—Next on the programme is location of the next annual meeting. Invitations are now in order.

J. S. Browne—I invite the Society to hold its next annual meeting in the City of Alton. We have good halls and hotels, and the best of railroad facilities, and as we held our meeting last year in the Central and this year in the Northern District, it is but just that the next meeting be held in the South.

Mr. Dennis read an invitation from the City Council, indorsed by the Floral Guild, of Carthage, to hold its next meeting in the City of Carthage, and moved that it be accepted. He said he had taken some pains to investigate the hotel accommodations, and had found that they were ample.

The Secretary presented an invitation from Galva, and Mr. Gastou from Lacon.

A ballot was now taken, which resulted in favor of Alton.

Song—By Miss Mesner.

### PARKS, NATURAL AND ARTIFICIAL.

BY H. D. BROWN, HAMILTON.

*Mr. President, Ladies and Gentlemen:*

"A thing of beauty is a joy forever" applies very appropriately to a park, for what can be more beautiful than well-kept grounds with trees, shrubs, flowers, graceful curving lines of road and paths, lakes, fountains, cascades and brambles, and all the beauty that makes a park like Lincoln of Chicago, or Central of New York, and numerous others in our land?

"A joy forever," for even now in winter there is a grandeur expressed in the leafless trees, with their many colors of bark and twig, their branches outlined against the sky, grimly defying the blasts of winter, while nestled at their roots are numerous plants, partly dormant, but beautiful still, and to the lover of nature showing the unmistakable signs of the great resurrection of the coming spring.

Natural parks take the preference, for in fact we could not have an entirely artificial park. We do have natural parks like our grand Yosemite. What joy it must have been to the first man who gazed upon that famous valley, with its cascades of over one thousand feet, and cliffs of mountain four thousand feet high, untouched by the hand of man. It seems to me one could not resist the impulse to bow the head to nature's God in view of these grand works of his hand. I am glad to note that our Government has taken the matter of preserving this valley, with all its beauty, for a grand National Park. Immense tracts of timber land should be reserved by the government, not only for their beauty, but for climatic influences; and it is more my object, in this paper, to encourage the saving, protecting and caring for our natural groves and rough lands, than to describe to you the artificial or planted park, of which I know but little from practical experience; but in regard to natural, will say I have the pleasure of living in this kind of a park. In fact our whole country could easily be made one grand park, situated as we are on the broad Mississippi, at the foot of the Des Moines rapids. Hamilton has fourteen miles of river view, unsurpassed for beauty even by the Palisades of the Hudson. A person standing on the bridge that spans the river between Keokuk, Iowa, and Hamilton, Illinois, views a magnificent scene; bold, projecting headlands, apparently covered with a natural growth of oak, maple, and other deciduous trees, with here and there the evergreen planted near the few houses on the bluffs, is the prevailing view of the Illinois side; while on the Iowa side, the long outer wall of the canal, with its graceful curves and broad ribbon of water, with the cliffs rising from one hundred and fifty to two hundred feet above, on which are very fine residences, but the timber has been nearly all cut off, and of course the greater part of the beauty gone. But while gazing as I always do on this beautiful scene, while crossing the bridge, I am forced to exclaim: "Distance lends enchantment to the view!" Why is one disappointed in a nearer view of the landscape? certainly not in the lay of the land, but on taking any road along the river side they will see it is the disfiguring work of man, by stripping bare of trees the beautiful, rounded knolls, and sloping valleys, to make fields. The consequence is unsightly clay knobs and muddy gulches, for the land washes badly, and in a few seasons the soil is all gone, and the crops raised do not pay for grubbing out, and consequently the field is neglected and allowed to grow up to weeds.

The early settlers seemed to think trees were made to make war on — a war of extermination — and if it were not for the fact that the land became poor so soon after removing the trees, there would have been no trees to make or help make the beautiful scene from the distance.

The greater part of the growth is what we call second growth, and by letting it alone nature will again clothe the hillsides, except when too badly washed; but we must assist her by planting the evergreen and other trees, and I urge on all land owners, everywhere, to plant forest trees on your rough and broken lands. They will add to the beauty of the landscape and help to retain the moisture in the atmosphere, which latter we have needed much the past summer. By a united effort of all the land owners to plant groves, in a great many cases saving the natural groves, the country will become more pleasing to the eye and the land more valuable. Especially is this the case in our section; but I am glad to note there is some little move in this direction, but we want more, and we hope to have the pleasure some time in the future of showing this Society the most magnificent landscape in the West, one that will bear inspection, by finding well-kept homes, smooth lawns, trees and flowers, but we can not do it now. I suppose the reason is, the people are too busy making a living to think of the beautiful.

As before stated, I have the pleasure of living in a park, and have no apology to offer in describing "Wild Cat Springs." The spring gushing out of a sixty-foot limestone cliff, about one-third of the way up, falling from a spout into a large tank, furnishing plenty of pure cold water for all, is the principal attraction of the grounds, with plenty of shade and picturesque walks over the bluffs. The principal picnic grounds being a plateau just above the spring, which is mostly covered with white-oak groves, interspersed with evergreens.

Wild Cat is not a park of set drives and paths; there are no notices "Keep off the grass," but instead one may roam at pleasure. But to return to the beginning of the improvement of these grounds. In the year 1857 my father, seeing the destruction of the forests then going on, decided to save one of the most desirable spots in our country from the devastating wood-chopper. He bought five acres surrounding the spring, and from year to year we have added to this, until there are now fifty acres. Portions of this, when bought, had, as the parties supposed, been all stripped of the timber except a few saplings, as we term them. By carefully saving everything that would make a tree, we now have one of the finest groves in the country, and with the attractions of the spring and cliffs, the grounds are visited by crowds of people during the summer season for picnicing and camping parties, coming mostly from Keokuk, Iowa, two and one-half miles distant, across the river. Keokuk has a fine park (Rand's), but they still come to Wild Cat, for the simple

reason that the natural excels the artificial. We, of course, have conveniences on the grounds for picnicers. An admission fee is charged at the gate, to keep up and improve the grounds, as it has been considerable work to put the grounds in order, as a great portion of them were covered with hazel brush and blackberry vines, which had to be removed, and then the natural blue grass came in, forming a nice sod. The greater part we pasture, except in the pleasure season. As the trees become thick enough to spoil the grass, we remove them by cutting so close to the ground that it would be hard to find where they stood. This can be easily done; possibly one may have to get on his kness to chop so low, but that will not hurt him. I find that by cutting low the trees do not sprout so badly, or if they should sprout, when pastured, the cattle keep the sprouts down. I can not see the economy of leaving stumps eighteen inches to two feet high, unsightly and a waste of wood. The extra wood will pay for the time taken in the low cutting. We trim up high enough to let top buggies under the trees, cutting limbs smooth to the tree. All brush must be entirely removed from the ground. It does not do to fill the hollows with it, for the water in a rainy time will wash loose soil underneath the brush, and you have a ditch before you know it. The best way is to remove all rubbish and let the hollow seed down to blue grass. I also find it will not do to let teams on the grounds, except on graveled roads, in a muddy time, for the water will follow the wheel tracks and one good rain spoil the grounds. If on any occasion you have your grounds cut up by wheel tracks, follow immediately with sharp steel rake and level the ground where wheels have cut. This is done rapidly, and saves a great deal of work thereafter. To protect the trees from careless persons tying to them, is one of the greatest annoyances with which I have to contend. Although having plenty of hitching posts and notices "Don't hitch to the trees," it is always necessary for some one to be on hand to see that this rule is enforced, or lose valuable trees by horses gnawing them. Many a fine grove has been entirely ruined by hitching teams to the trees. We have planted from time to time evergreens on these grounds. They now are from five to thirty feet high, the Scotch Pine doing the best. Norway Spruce did finely until this season, but am sorry to say I have lost largely by the drouth. Have Hemlock and Mountain Pine doing well. Balsam Fir and Irish Juniper not doing so well.

I have planted only a few deciduous trees, as the natural growth was sufficient for shade. The last two seasons have been very hard on newly-planted trees in parks and yards. We must be prepared to irrigate or mulch heavily, or both, our newly-planted trees, and to fertilize those already planted, for removing the grass and the constant tramping impoverishes the soil, and we must do something to keep up the growth. Stable manure spread over the grounds in

winter, then all coarse matter raked off early in the spring, is a good way to keep up the lawn as well as the trees. While it would not be possible for many to save on their grounds a park like Wild Cat, they can, in many instances, save beautiful groves, and every village should have at least one natural park, if possible, if not, an artificial or planted park.

When contemplating this part of my subject, I wrote several gentlemen to obtain what information I could in regard to trees and shrubs suitable for park planting, and am under obligations to the following for their kind responses: Park Commissioners, St. Louis; Superintendent Lincoln Park, Chicago; Robert Douglas & Sons, Waukegan, Report of Forestry; Joseph Heinl, Jacksonville, List of hardy trees and shrubs; Samuel C. Moon, Morrisville, Pa., for quite a lengthy letter, which I can do no better than to give you in full. Mr. Moon says: "Purple Beech, a fine tree that can be used to excellent advantage, with admirable effect, in many places, and should be placed more conspicuously before the public. Avenues of purple beech, or of purple and plain green beech alternated, are very effective but rare. One cause of their scarcity in large plantations has been the small size of trees usually sold from nurseries; another is the idea of their slow growth and that they are difficult to transplant. The way to get avenue trees is to work them high and grow as standard trees on well-grown stocks of American or European beech. Well-grown nursery trees that have been frequently transplanted will form fibrous roots, and, if carefully handled, can be moved with as little risk as maples. They need mulching heavily for two summers after transplanting, as the roots are particularly sensitive to heat and drouth. In some seasons it is sometimes necessary to shade the trunks in very exposed situations. Another ornamental idea not much used is Crimson Dogwood for hedges. In winter the bark is bright, glossy crimson; a dense mass of it is very conspicuous, particularly when the ground is covered with snow. Run two strands of barbed wire over the hedge while it is small, and, as the plants grow, twist them around the wires, and in two or three years there will be a beautiful, effective fence without the objectionable rampant, thorny plants used for hedges. Pyrus Japonica, Japan quince, is one of the best hedge plants. It is thorny enough, but not too thorny: roots run very deep but do not spread, consequently do not interfere with close farming.

"Arbor Vitæ, 'George Peabody,' the new golden Arbor Vitæ, is very hardy and beautiful. It is a brighter golden color than any other variery, is scarce, but will be very popular as soon as known." In hardy shrubbery Mr. Moon mentions two new Japan varieties, very hardy and excellent — Exochorda grandiflora and Rhodotypus kerrioides.

While some of the trees and shrubs recommended by Mr. Moon may not stand our severe climate, I would be pleased to see them tried, as we need more variety.

Reports of the Chicago and St. Louis parks are very interesting reading, as each city has thousands of acres in parks, and expends hundreds of thousands of dollars, annually, to improve and keep them in order, and the money is well spent, as the thousands visiting them will testify. In regard to trees for park planting, I think the Maple and Elm stand at the head of the list, especially hard Maple and American Elm. In other native trees we have Ash, Walnut, white and black, Oaks of numerous varieties, Wild Cherry, Kentucky Coffee, Mulberry. Hickory, Hackberry, Linden, Locust, Box-Elder, Persimmon, Paw Paw, and numerous others. In hardy shrubs we have Syringas, Altheas, Spireas, Hydrangeas, and numerous others that, planted in groups, mixed, have a fine effect. Hedges of evergreen are highly ornamental — Norway Spruce, Arbor Vitæ and Hemlock, being the best. Plants should occupy an important place in a park.

Persons contemplating planting a park should first establish near their proposed grounds a park nursery of forest trees, evergreens, shrubs and plants, for it is better to remove the trees but a short distance. Parks are sometimes made by removing large trees from the forest, this is expensive, and with the best of attention some of them will die. Then, it is convenient to have trees to refill, and it must be for all time to come, for you will have to refill a park every year, the same as you do an orchard.

In planting park trees, great pains must be taken to dig large holes, say at least four feet in diameter, and two feet deep, using the best of soil to set the tree in. Stake well — on no occasion let the sod form up to the tree. Heavy mulching or constant cultivation is absolutely necessary, for two seasons at least. I often set my trees in the center of a circular bed, from six to eight feet in diameter, planting verbenas around the edge of the circle, and have the flowers and trees do well. It requires constant watchfulness to make the trees live the first season, and it will never do to neglect them afterwards. Borers and other insects will have to be looked after the same as fruit trees. Trimming should be done early in the spring, before the sap starts, for we want wood growth on a park tree. The grading of roads and paths, rock and rustic work, if judiciously done, add to the beauty of the park. But these are only secondary, the first thing in a park is shade trees, and plenty of them. In laying out a park, every piece of land has its peculiar adaptation to the way it should be laid out, no set rule can be followed, and no landscape gardner would lay out a park until he had first seen the land proposed for that purpose.

I hope no one will defer planting until he can employ a special artist to plan the grounds, but will plant judiciously of ornamental trees, shrubs and plants, to make home attractive to their families as well as the passer-by. The humblest land owner can do this, for in a great many parts of the country the trees can be had for the

digging, and nurseries often furnish them for less than a person can take time to get them from the forest. Shrubs and plants are also very cheap. Do not think that I would discourage the employment of landscape gardeners — far from it, and no one who has the means should think of planning their grounds without an artist any more than they would their dwelling. How often do we see thousands spent on a residence employing the best architects, then let some unskilled laborer have the job of grading and planting the lawn. Town and village improvement societies are a good move toward beautifying our country, and should be encouraged. Practical application by individuals will work wonders in a community. While the subject of parks is of great importance to our country, I fear I have taxed your patience, and have said but little that will be new to you as horticulturists. I shall feel satisfied with my effort, however, if it should encourage the planting of even a few forest trees, but more particularly saving what we already have. "Woodman spare that tree."

## WHAT WE DRINK.

BY DR. HALL, CHAMPAIGN.

It cannot be gainsaid that man has an innate desire for a nervine stimulant, and has in all ages, whether civilized or in a barbarous state, devised drinks that stimulate and make drunk. It is also a humiliating fact that he has but very little regard as to the moral degradation and misery entailed, or the abridgment of his life. If he can only enjoy the present fuddle, it is all he cares for or desires.

The first drink known, used by man, is wine. As long back as we can trace his history, the grape was cultivated as a leading industry, and by many of the fathers its fruit and expressed juice was regarded as a real invigorator of man. The fruit and wine appear to have been a daily food among the people of Palestine, where the grape appears to be indigenous to its soil. When Caleb and Joshua, who visited this land as spies from the Jewish camp, returned, they brought glowing reports of a goodly land whose hills, valleys and rocks were festooned with vines loaded with tempting fruit. The wine press is often alluded to by primitive writers, who praise its many virtues; and modern experience shows that within certain limits it is a wholesome stomacher, when pure and free from adulteration. But alas! this wholesome beverage has been, for purposes of sordid gain, grossly counterfeited; so, when we buy wine, we do not know whether we get grape juice or not.

To make wine artificially, is now a trade in which many men with much capital are engaged, and these spurious wines are found in all our retail shops of beverages as the genuine juice of the grape. So expert have these wine makers become, that nothing but chemical tests can detect the fraud.

In a recent reliable authority (The Brewer and Distiller) it is claimed that no less than eighteen different coloring agents and twenty-five flavoring agents, besides five mineral substances, are used by wine manufacturers to prepare wine for the market. This book belongs to the trade, and is not intended for the public, so it can be relied on as substantially correct.

Such wines are no wines at all, and militate against the vine grower. It keeps our grapes below the cost of production, and if perchance the grape is used for wine purposes, it is so adulterated with vile concoctions that it is no longer wine containing pathological properties fit for use. Against these vile frauds every cultivator of the vine should raise his voice, not only so, but the people of the State should put a stop to a system that prevents the culture of the vine in our State. The persons who make up our State Horticultural Society have fully demonstrated that the grape can be made a profitable industry for our people, and can furnish grapes to make pure wine, free from poisonous minerals that destroy man with a lingering death.

There can be but little better said of brandy. This is, when pure, a product of the grape, being made from the lees of the grape after the wine has been pressed out; or it may be distilled direct from the wine; but when made from the lees, gives quite a profit, that otherwise would be a loss. Such brandy, with suitable age, can be used to great advantage as a diffusible stimulant in some forms of disease. But the liquor vender cheats the public out of this pure product of the grape by putting on the market a spurious article. He takes alcohol, adds an excess of burnt sugar, sundry portions of cayenne pepper, grains of horse radish, paradise, active ether, etc. This doctored alcohol is barreled, bottled and labeled with gilt letters, christened *a la* French. The very name is a fraud; not one particle of grape enters into its composition. This is the stuff the trade furnishes us with as a stimulant for our loved ones when sick, which our husbands, sons and society are enticed to drink. It is a disgrace to our State that such a fraud is tolerated.

It has been demonstrated by careful chemical investigation that the intoxicating properties of alcohol are greatly increased by being thus made into artificial brandies, so these artificial brandies have a lethal action of nearly double that of pure grape brandies. They very soon produce chyrotic conditions of the liver and uriniferious degeneration of the kidneys, as has been demonstrated by Faust, Rabuhean and other eminent pathologists of the French school.

As our nation is fast becoming a nation of beer drinkers, it would be an interesting theme to follow up the tricks of trade known to the brewers, but time would fail me. But I cannot pass without giving a brief word to a slop known as orange cider. This is a beverage comparatively new to the fashionable guzzler. It is claimed to be made from oranges, as a means of working off the

surplus oranges found on the market. It is a fraud. All the oranges there are in it are barely enough to give it flavor. It is only a vile concoction of a number of agents that cause a slight acid ferment. To this, hot spirits can be added, and when drank by the beverage guzzler he can feel his Ebenezer loom up in his brain. Ah, what illusions of delight fill his brain as he lays in the gutter, a fit companion for those animals into which another kind of spirits entered after they parted with the society of the renowned Mary Magdalene.

But I must leave this fruitful theme of thought and turn to a pet subject of some of our thrifty apple growers, who with zealous scruples strive to utilize their surplus fruit and keep the demon spirit dormant as long as possible and make a drink that is potable, agreeable and not intoxicant. Such is sweet cider, or what should more properly be called unfermented apple juice.

The venders of cider, as a rule, select sound, unmarketable fruit to make into cider. When the juice is pressed from the pumice he filters and then heats the juice to nearly boiling point. This causes the lees to rise to the surface, so they can be skimmed off — for more or less lees will pass the filter with all due care. This heating destroys germs and spores that act as ferments. In this condition he barrels; then adds about two ounces of salicylic acid to every thirty-two gallons of juice. Some dissolve the salicylic acid with soda bi-carbonate. The soda, besides acting as a solvent to the salicylic, covers its unpleasant taste. About two grains of soda bi-carbonate will dissolve about an ounce of salicylic acid. When this compound is added to the cider, the barrel is closed so it is perfectly excluded from the air. Whatever germs have failed to be killed by the heat are either destroyed or held in a static state by the anti-ferment properties of the salicylic acid. The juice remains sweet. I say juice, for in its present state it is not entitled to the nobility of cider, having no intoxicating properties about it, and will remain so as long as air is kept from it. If air is admitted, it bears with it germs and spores that soon overcome the static power of the salicylic acid, and the juice takes on a ferment, and alcohol is set free by a new combination of molecules, and the juice has become cider, and now is an intoxicating beverage.

Up to this stage the salicylic acid has suffered no decomposition by breaking up its molecules into new combination, but now its chemical combination begins to dissolve, and salicylic acid is no longer found in the cider, and the beverage is only relished by the toper, and from this on is christened with the classic name of "hard cider."

The salicylic acid in a half pint of cider would be less than two grains. If a man drinks a quart a day (an amount many do drink) he would take into his system about sixteen grains of salicylic acid a day. If this is followed up for days large amounts of this drug would be ingested; but we should remember it is also eliminated from the system, so it does not accumulate in the organs.

The great question to be solved is this, will moderate doses of the salicylates do harm? Chemical experience shows that no serious harm or inconvenience is seen from quite large doses of the drug, given in the rheumatic state. We know, however, the system under certain pathological states will tolerate many drugs it will not in health, and we are not to regard the public as ill. The persons who are ailing and demand the use of the salicylates, are very small in proportion to the millions of consumers of the salicylated foods and drinks. It is a well-known fact that people who have kidney disease cannot tolerate salicylates, and there are plenty of people, who are apparently well, who are suffering more or less from albumineria. Old persons do not tolerate the drug well,—perhaps because the glands that eliminate these salicylates from the system have become enfeebled by age, and in a bad state to do extra work. A feeble heart bears not this drug well. Again, a person who is troubled with different forms of dyspepsia are very unfavorably affected by the salicylates. It may be from the fact that it acts as an antiferment to such a class of persons. While these are known facts in regard to the injurious action, is there anything to be said in favor of their use? We think there can.

When salicylic acid is added to apple juice, for a time it prevents acid ferments and causes it to be pleasant to the taste, besides, it has been found that small doses of salicylic acid may promote digestion where there is fermentative changes in the food as in catarrh, dilation of the stomach, also in gastralgia, accompanied with organism of sarcina it is a valuable agent when taken in moderate doses. But if taken in large doses, say from thirty, sixty to eighty grains, it is very apt, if repeated, to cause an uneasy feeling in the stomach, vomiting, with a dull headache, buzzing in the ears, deafness, and lastly, as observed by Ringer, Morehead and others, that under the influences of large doses, accumulations of the acids take place in the cerebo-spinal fluids, causing an excitement at the root of the pneumogastric nerve, and by depressing its function and suspending its action, arrest respiration and causing death by asphyxia.

In the small amounts of salicylic acid that is required to suspend the ferment and destroy the spores in the apple juice, if only a reasonable amount is used, it can only act as a healthy tonic to the stomach — providing the individual has sound heart and liver and free from albumineria kidneys.

Salicylic acid is not a staple compound, being composed of carbon, oxygen and hydrogen, the molecules soon lose their magnetic influences for each other, enter new combinations and is no longer salicylic acid, and now the question arises, may not these drinks be just as dangerous, if not more so, owing to the fact that the product of the decomposition of the salicylates are, themselves, dangerous to health. I think they are not, yet I am unable to settle this point to my own satisfaction without further thought.

A committee appointed by the French Government forbade the use of salicylates in all articles of food and drink — for if once allowed or authorized in trade, it was sure to be put into all sorts of food product liable to fermentation that are staple without its use.

It was proposed to the committee, that they could label all such goods, including the well known "butterine" product (for it is a well-known fact that many intelligent persons of high moral profession no longer regard it as a crime to sell lard as butter, stained and polished coffee for what it is not, corn flour for wheat flour, water for milk, meats doctored, for a prime article; these are regarded as mere tricks of trade. The word adulteration is too harsh a word for their sanctimonious ears, and they prefer to call them "substitutes"). The committee, therefore, well knowing the depravity of human nature and the clinical observation that feeble and prolonged daily doses of salicylic acid and its derivitives can cause considerable trouble to the health of certain persons who are sensitive to these forms of drugs, particularly in old people, and in those whose venal or digestive functions are no longer in perfect order, would not allow the use of the salicylates in any liquid or solid aliments. Perhaps the committee was a little tyrannical in its "order," that they would not allow the people to practice such a glorious "liberty" as to slowly kill one another. It takes the boasted freemen of the United States to indulge in this luxury.

The question to be settled by us Illinoisans is that if we must have beverages to tone up our stomach and stimulate our nerves, let us have a pure article. We say then let us have a commissioned committee, whose business it shall be to see that foods and drinks are not slow poisons. Or if we feel it hurts us less to be slowly killed than it does a Frenchman, then let the "slop doctors" go on in their vile death-producing beverages.

When we take a careful survey of the vile beverages we are making as a people, and pouring into our stomach, it looks as if pain, suffering, and a premature death had no terror for us. A noble manhood is given up to a life of shame, a life of gluttony, debauchery, and premature death; and to fortify and legalize this work of disgrace, our people band together to frame iniquity into law, legalizing a debauchery to disgrace our homes, and rear our tender offsprings in ignorance, hunger, and rags. Shame on boasted freedom that hurts us less to be slowly killed than it does a Frenchman. Wine, beer, and cider, when pure, may be used within certain limits. But beware lest they bite like a serpent and sting like an adder, and poison and destroy our manhood.

## WHAT I KNOW ABOUT FRUIT GROWING.

BY D. H. GRAY, ELMWOOD.

*Mr. President, Members of the State Horticultural Society:*

I have no doubt that your committee occasionally find the making of a good programme no easy task. Sometimes a medley in the midst of stately music is restfull, and agreeable to the audience, so, perhaps, a paper of the "hit or miss pattern" was deemed by your committee the proper thing for this hour. A man standing in front of an intelligent body of practical horticulturists, seeing in every head a pair of serious eyes asking of him "What do You Know About Fruit Growing?" may be a position quite restfull and agreeable to the audience, but what of the man? He is like a newly landed fish, with too much air for comfort.

To know, to be in the possession of facts, is valuable to the one who has wisdom and energy sufficient to apply them. 'Tis true that knowledge precedes wisdom, and that wisdom precedes success. But a man's success is not always the full measure of his wisdom, and less often, is a man's success a true measure of his knowledge. There is a great waste of knowledge through the lack of energy, and wisdom, to make application. Mr. R., in the rich district of A, is by far the best informed on subjects bearing on general agriculture of any of his neighbors, but his house is crumbling, his barn is a rattle-box, his bars are without posts, while he sits by the spring in the shade of a wild crab tree, watching the graceful curves of smoke as they chase each other from the bowl of his "cob pipe."

We admire the man who is really in pursuit of knowledge,—as we note his energy in pursuit, we prophesy his attainments, but to see a man dodging around in the blowing current of thought, hoping to catch some ideas in the frowsy hairs of an uncombed head, is to see one outside of prophecy. Have you ever tried to catch thistledown in a brisk wind? A very interesting game to spectators. If you capture one the down is injured in all its delicate tracery. Neither by retirement is knowledge gained, but by a certain condition of the student. A sincere love for the knowledge sought. A man so possessed is always gaining knowledge; energetic effort is the test of his love. To him knowledge seems to attach itself, while he arranges and classifies according to his purposes in life, until it becomes one with him, and that which he failed to classify, arrange or assimilate, passes off or hang as shreds to his garments.

"What Do You Know About Fruit Growing?" Yes, I hear your question, and it brings the subject of this paper to my mind in a serious way. I heard Mr. Gough say, when introducing one of his peculiar lectures, that a subject was "only a peg to hang thoughts on." This peg has room to hold a great many attempts at thought. During my school-days an incident occurred which I will relate. A

committee for some charitable purpose in Chicago called at our boarding hall in the spring of the year, asking for all the spare garments on hand. They would be pleased to take all the old underwear, etc., that could be spared, and hoped we would be kind enough to leave the garments in the lower hall that evening, as they would send a team for them early the next morning. A company of a hundred or more students in the spring of the year are apt to have something to spare. So a gracious pile was made near the entrance of the lower passage. A certain student living in the village was passing by in his early morning ramble, saw this pile of goods, and not being acquainted with its purpose, must come to some conclusion about it, and after a brief examination concluded it needed airing, so he removed the pile to the lawn and attached the garments one by one to the line of our new flag-pole, until from the base to the tip of the pole he had swinging in the lake breeze all the colors of the navies of the world. Transpose that pole to a horizontal position in a firm wall, and you have — a long peg.

Good seed will grow, if properly planted. Plants will grow, if alive when properly set; so of trees. But all seeds will not take kindly to the same treatment, neither will all plants or trees. Here is where knowledge is wanted — knowledge of seeds, knowledge of plants, knowledge of trees, knowledge of soils, knowledge of modes of work, knowledge of climate, of cultivation, of culture, of diseases and remedies, of insects and how to exterminate the injurious and encourage the friendly. Yes! if one knows how to grow fruit successfully, he knows more than would hang on a short peg.

C. N. Dennis — I move that the following ladies and gentlemen be made honorary members of this Society:

H. E. Van Deman.....Washington, D. C.
Henry Avery.....Burlington, Ia.
Chas. Patterson,.....Kirksville, Mo.
J. A. Spear.....Cedar Falls, Ia.
W. A. Herring.....South Allen, Mich.
Mrs. J. P. La Monte.....Hamilton, Ill.
Miss Alice Stewart.....Hamilton, Ill.
Mrs. Arthur Bryant.....Princeton, Ill.
Mrs. L. R. Bryant.....Princeton, Ill,
Mrs. R. D. Harrison.....Princeton, Ill.
Mrs. J. H. Elliott.....Princeton, Ill.
Mrs. John Scott.....Princeton, Ill.
Miss Nellie Rockwell.....Hamilton, Ill.
Miss Mary Mesner.....Mendota, Ill.
Miss Mary Cotta.....Nursery, Ill.
Miss Maud Stone.....Princeton, Ill.
Mrs. U. Simons.....Princeton, Ill.
Miss Lucy Bryant.....Princeton, Ill.

## WEDNESDAY AFTERNOON.

Music, piano and violin, by Miss Clark and Miss Mesner.

The Secretary read a telegram of greeting from the Kansas State Horticultural Society, and a letter from the Illinois State Grange, in session at Springfield.

On motion, H. M. Dunlap and C. N. Dennis were appointed a committee to reply.

Secretary — As some of us know, Prof. Van Deman, Chief of the Division of Pomology, who is with us to-day, is trying to arrange a circuit of western State Horticultural Societies, so that the meetings of neighboring States will not occur on the same date. This arrangement will bring our meeting the second Tuesday in December. I move that we adopt this as the regular time of our annual meeting. Motion adopted.

### NEW APPLES AND PEARS.

BY ARTHUR BRYANT, PRINCETON.

The subject assigned me is one that will be quite difficult, for any one located in the Northern District (and I shall confine my remarks to that portion of the State entirely) to treat of, so far as giving any practical results is concerned.

Attempts have been made in the last few years to test many new varieties, but the wave of destruction to our orchards, that has passed through the western country, has not only taken our old trees that we had top grafted, but most of the young trees that were planted.

This, with the unfavorable circumstances attending the blooming and fruiting of what few trees we have, gives us but little material from which to make our report.

Under these unfavorable circumstances it is with much reluctance that I try to occupy a few moments of your time, trusting that my colleague will be able to give you something much more interesting and instructive.

There are very diverse opinions among those who have given the subject the most attention, and who are supposed to be the best informed as to the cause of the great destruction of our apple orchards in the Northwest.

The determination of this point would have much to do with the method and place to look for a remedy.

Some of our Iowa friends are looking to the Steppes of Russia for a solution of this question, claiming that on those far Eastern plains they have climatic conditions very similar to those of our Northwest. That the types of trees and plants that will endure their dry atmosphere are just what we want on our Western plains. Others are of the opinion that we must look for a solution of this question in hybridization, in raising new varieties to the manor born. That fruits to be thoroughly adapted to any locality must be originated there.

Still others are of the opinion that the trouble is one of temporary duration, that the unfavorable conditions which we have had for a term of years past will not long continue, and that our old varieties will again be vigorous and answer our purpose as well as they have in the past. But whichever plan you take to solve the question, it will take time to bring around any satisfactory result.

The thorough testing of any variety of fruit means years of growing and fruiting, and to give even a partial recommendation of a new variety should include more than one season's acquaintance.

For these reasons I shall say but little in regard to any of the new apples, only giving a few notes of growth and appearance of trees as I have found them in the nursery, hoping that another season's experience will give us more practical knowledge of their real value.

For several seasons we have had special call for some of our old varieties that were not very popular with most tree planters in former years.

The reason assigned for wishing these particular varieties was, that they had endured the severe winters and, in many cases, were the only trees that were left in their orchards. Among these varieties are Northern Spy, Roman Stem, Maiden's Blush and, in some localities, Minkler, and Cayuga Red, or Twenty-ounce Pippin. In former years most of these varieties were not considered more hardy than many others that have succumbed to these unfavorable winters.

The testimony of different persons in regard to the matter often conflicts, and the reason why these varieties survived, and the others failed, has yet to be learned.

For several years I have been growing more or less of the newer varieties, with varied success. With the majority of them my experience covers only two or three seasons, during which time we have had a good growth on our trees generally. Among the Russians, Yellow Transparent, Red Beitigheimer, Belle de Boskop, Longfield, Titus, Enormous, and Switzer have given a very fine growth, having a thick, heavy foliage that promises to be able to resist the ravages of insect and fungus growth.

Among our newer native varieties I will mention Utter's Red, Wolf River, Salome, McMahon, Sutton's Beauty, Clark's Orange, Arkansas Black, Saxton, etc., which came to us with strong recom-

mendations, and all promise to be acquisitions. Among the varieties named I think the Yellow Transparent, Red Beitigheimer, Wolf River and Salome are deserving of special mention, as promising much in general growth and habit of tree. Perhaps an equal acquaintance with many of the others would place them fully as high in my estimation.

I think we will have to look largely to new varieties for our future success in fruit growing, but I do not feel assured that we have them at our command at present, though we may have the material from which we can produce them by judicious and systematic crossing of varieties that have some of the qualities that we wish to retain in our prospective fruit.

System is necessary to success in any line of business. The successful breeder of stock of any kind must have his ideal of what he wants, and selects his animals to produce these results. So, in producing new fruits, it is necessary for us to have an end in view,—choose varieties that have the special qualities that we wish to produce, for the parents of our new plant.

But whoever undertakes this task should first sit down and count the cost.

In the originating of new varieties of fruit there is a wide field for study, experiment and labor (more especially labor), as the production of a new variety of any value usually means years of experimenting and many failures, with only here and there a success to reward one for the large amount of toil and frequent disappointments.

But I have occupied far too much of your valuable time, and will close with the wish that some one else can give you some practical information on "New Apples and Pears."

## NEW APPLES AND PEARS.

BY T. E. GOODRICH, COBDEN.

After an extended correspondence and many questions, I present the following facts, a part of which are, of necessity, not the result of personal observation:

### APPLES.

Picquet, at Villa Ridge, Ill., is a large, firm, winter apple, shaped like Pryor's Red, of which it is said to be a seedling. A good keeper, not as highly colored as Ben Davis, but of better quality and a better bearer.

Crain's Spice, medium size, red like Wine Sap; hangs on the tree well, and is a good keeper.

Egyptian Queen dropped its fruit this season; not well adapted to a dry season like the past.

Park's Keeper, a fine apple, and the tree a pretty grower; but, owing to its proneness to drop its fruit, is not considered profitable at either Centralia or Villa Ridge.

A new seedling has been originated by Mr. John B. Miller, of Anna, Ill., who favors me with the following description:

Resembles the Wine Sap, of which it is a seedling; about the same size, not so dark in color, a deep blush, and presents a beautiful appearance; promises to be a long keeper; of good flavor, and at present writing — Nov. 30th — firm and solid. Tree much resembles Wine Sap in growth and shape. Too soon to speak of hardiness of tree, since it has fruited but once. Not named as yet.

PEARS.

Mr. George Gould, of Villa Ridge, informs me that he has a new pear, or an old variety revived, he is not sure which. It goes with him by the name of Early Winsor; it is early, a good bearer, of good quality, good foliage, good upright grower and free from blight. One tree, twenty-five years old, has borne annual crops of good fruit, that sold for the highest price. These are all good qualities, and if this variety will do as well in other localities as with Mr. G. it will be a great acquisition to the list.

Of new varieties, the notorious Keifer and Le Conte, thanks to very extensive advertising, are most generally known.

As trees, there is little more to be desired; perfection is nearly realized in twig, leaf and sap. Of the first little can be said; only a few class it as good. Their entrance into society, like that of some people, is due to their good looks; it is more highly prized in lithograph than in the baskets of consumers. Little or nothing is known as yet, of the market value of either kind, for not enough have been grown to establish quotations. In a specimen orchard on our place, I planted, last spring, the following varieties. It is on virgin soil, and trees well cultivated and fed, to determine, first of all if there are any that are absolutely blight proof.

One row is Lawson, said to be an old friend under a new name at the east, but a new one in the nurseryman's catalogues. All the trees have succumbed to the drouth but one.

Jefferson, Berket, Early Harvest, Hoosac and Rulter, all this year have been good growers, healthy and hardy, and although not strictly speaking, new varieties, are not generally known, and in consequence would be mentioned in the same connection. The two former are not very highly prized for their eating qualities by those who have fruited them; but the latter come well recommended. Men, in their disappointment at the death of fragile trees, have directed all their energy to the production of hardiness of tree, and have nearly lost sight of quality of fruit. The chief recommendation in an advertised tree now is, that it is "blight proof."

Would it not be the wiser plan to call a halt and develop the quality of the fruit.

H. D. Brown — How about the Keifer and Le Conte pears; are they free from blight?

Mr. Webster — The tree is fine looking; also the fruit, but they sometimes blight.

Prof. Van Deman — I have eaten the Keifer in all sections of our country from Michigan to Texas. In the north the fruit is less palatable than it is when grown in more southerly regions. In most instances have found the tree in favorable condition.

Charles Patterson — I have fruited a few trees of Keifer, and was probably fortunate in my manner of ripening the fruit. I gathered, a little before ripe, and set them in a dark room to ripen. Under this treatment we found them very good.

Prof. Van Deman — All over the northwest a deep interest is felt in this question of hardy fruits. I speak without prejudice when I say we shall probably gain more from testing our own seedlings than in any other way. Heretofore the best results have been in this direction. As yet the Russians have done little to sustain their reputation for hardiness or productiveness, in this country, and this remark will apply with equal force to the Russian apricot. In the way of Russian cherries we are doing better. We have also been over to Japan for plums, but they are not found to be hardy in this State. Kentucky and Tennessee have also condemned them. There are doubtless plums and pears too in Japan, which are better than any we have as yet introduced. I have as much faith in testing fruits from Arkansas, especially apples, as from more northerly regions. I have been much impressed in regard to the value of some of the newer southern varieties. As to the Japan persimmon, it is not hardy, even in Northern Texas. But we yet hope to get a persimmon by hybridization with our common natives, on the Japans, which will be a grand improvement, and which is doubtless attainable. The quality of the Japan is good, but the fruit is too soft. The Japan chestnut, with us, is not hardy, and is unworthy of cultivation. In nomenclature there is much confusion. Some of the so-called Japan plums are undoubtedly from our already familiar home-grown varieties.

T. E. Goodrich — When the Le Conte and the Keifer were first introduced, it was with a grand flourish and great promises. They

have never redeemed that promise. Unless early picking improves, they are too poor in quality.

Mr. Webster — Keifer, and in fact many others of our pears are much improved by picking a week before ripe — pick as soon as they will part readily from the stem. I speak from experience.

## FAITH IN PROFITABLE APPLE-GROWING IN THE WEST.

BY CHAS. PATTERSON, KIRKSVILLE, MO.

It seems that your wide-awake officers have happened to hear of my planting 12,000 apple trees last spring, on a solid eighty acres of ground, and therefore kindly invited me to give you a paper on this subject. The invitation might also be construed as a demand to give a reason for the faith that is in me, or to show, if I can, that I am not a visionary enthusiast, or losing my mental equilibrium. Of course I have no serious apprehensions that you will fail to show and feel all the respect that is due to any thing I may say, but if your orchards do not speak for you and against me, louder than words, I will give you credit for doing far better than my neighbors at home, with scarcely any exceptions. I have had to take most of my lessons from others by contraries — by warnings how *not* to do it — and I would go one hundred miles, afoot if necessary, to see an orchard twenty or fifteen years old, that I would call even approximately well taken care of.

Some ten or twelve years ago, I went to a neighbor's orchard to get some cions that I could not well procure elsewhere. There were six trees about fifteen years old, but I could not find a single cion of last year's growth, even two inches long. In fact they seemed to have made scarcely any growth at all, and as they had never been pruned, as far as could then be judged, there was not even a water-sprout. The ground was closely set in grass, which had been mowed or pastured for years, as had seemed easiest or most remunerative. That orchard, about ten acres, had been written up and talked about as proving the excellent wisdom of planting orchards for profit in our county. It was scarcely known to have failed of a remunerative crop, and had actually paid for itself exceedingly well. But I quietly made up my mind that it could not continue to do so many years, and sure enough it has never bore a single good crop since. I had not observed this want of growth in orchards before as I have since. Now I can distinguish it from the car window, at a distance of several hundred feet, summer or winter. And I very seldom see an orchard of the same age that is in much better condition. Our soil makes a peculiar, close sod, and finer hay than Western Missouri, or Illinois, as far as I have seen, and therefore our trees will show this condition several years sooner, but it is only a question of time in

almost any place, and wherever we find this want of growth, it is safe to predict that we will find very occasional crops, and mostly small fruit, in the exceptionally favorable seasons, and also a number of dead and dying trees.

What right have we to expect anything else? Do we find large, plump raspberries and blackberries on small, stunted canes, struggling in sod for a puny existence? No! The berries will be in proportion to previous year's growth of canes, as well as the season for growing and ripening of berries. Do we expect to gather large corn whether we push a large growth of young stalk or not, if the season happens to be right? Not as a general thing. We have occasional seasons when most any management gives a fair crop, but they are as far between as our good apple crops. Do you think there is a wide difference between an annual like corn, that has to grow its whole supply of roots to suck up plant food for leaves and grain every year, and an old tree that has already such a system of roots organized to draw its supply from deep down and near the surface? My observation and reasoning indicate that they are actually parallel; that the tree extends a system of new roots every year, as well as corn does, and that when root growth is stunted or obstructed, it ceases to grow at the top, and can no more bear fruit than the stunted corn stalk can bear a full sized ear of corn. We have all made a mistake in overlooking this parallel. It has become a stereotyped direction, in our reports and instructions, to sow the orchard to grass when it begins to bear, or when we wish to hasten that period, and this hastening is to-day regarded as a triumph and vindication of a slovenly and delusive practice. The Jews gained a very similar victory for Orthodoxy on Mount Calvary, and have not yet admitted their mistake, although they never could avert, or escape from, the consequences.

In view of such inrooted and mistaken obstinacy, permit me to repeat and lay it down as an axiom, that when an apple tree cannot make a free extension of root growth, it also fails to make a clean, healthy growth in the top, and the fruit will be exactly in proportion in development and bulk, though the number of apples and seeds may be multiplied. When the tree suffers any injury, such as taking off a ring of bark, driving a number of nails in the body, boring holes, girdling by borers, twisting wire around the body or limbs, it immediately directs its forces to repairing the injury, and also to reproduce itself by seeds, as if conscious that the end of its destiny is in danger of early defeat. Grass sod, long continued, tramping by animals, or anything that obstructs the free passage of water and its solutions of plant food from the surface soil to the roots, has the same effect in shortening its growth, and producing fruit prematurely, as the direct mechanical injuries referred to.

Neither can the apple tree find all the nourishment it needs down below the range of grass roots, as maple, ash, locust, etc., seem to

do. This difference can be regarded as an infinitely wise provision, rather than a defect. It conveys the promise of reward for diligence and mental physical activity, where sloth and indolent avarice will be "left" to bitter but well deserved disappointment. While we expect but mere germs for reproduction on these forest trees, and their highest usefulness to us is found in their dead carcasses, with only incidental shade and beauty, when in their prime, we may confidently pronounce the fruit of the apple tree, and its numerous auxiliaries, the lever that elevates as on a physical plane above the primitive and gross "hog-and-hominy" age, with its degenerate craving after alcoholic stimulants. Is the difference not well worth some extra work? Could we reasonably expect regular crops of fruit with the same labor as would produce a grove of forest trees? Is it visionary to expect results in proportion to our efforts in this direction? Is it visionary to plant a large orchard on the plan of this departure, when I see plain decay and destruction all around me by the old methods? Is it safe to estimate that this departure will be twenty years on the road to general acceptance and practice, and will witness still more and sorer disappointments, of the few who now have promising young orchards, and may never reach the average farmer? The apple tree must and will have a share of dissolved plant food from the surface soil. This, a dense mass of grass roots, or a tramped and baked surface, will prevent from reaching the apple roots originally grown for surface feeders. Put a plow into your old orchard sod, as shallow as you can split it, and you will cut a large mass of ample roots. Where do they come from and what do they come for? There was not one of them when you quit cultivating, whether at four, eight or twelve years age of trees. At least I have never found one in my ten-year-old orchard. They are sprouts from horizontal roots and perhaps extensions from former terminals, that seem to be sent up to get a share of the nourishment referred to, before the grass roots shall have appropriated all. Said a distinguished doctor to me as we passed a stately old apple tree, full of very small fruit, and making no wood growth, as plainly indicated by the color of the leaves: "What is the matter with that tree, what makes the fruit always so small?" I answered, "Starvation!" "Tut! tut! man," said he, "what do you mean? Do you see that grass and clover, at least two tons to the acre; do you call that land poor?" I said: "No, the land is rich, but the tree cannot eat green grass, and the grass roots are too numerous for the tree to get all the nourishment it requires, and is therefore starving almost as effectually as your horse would if you tie up his head and turn him loose in that luxuriant grass."

But some of you will say: "We have lost our trees largely by hard winters, and the remnants are so badly damaged that they might as well be dead. If we had cultivated as you advocate, they would have been still more liable to get killed even in moderate win-

ters." I approach this question with far more diffidence in this latitude than I would at home, and will not venture to assert that all your orchards in the extreme north could have been saved by my method, but I will say that cultivation in the early part of the season does not make them more tender. Late growth, unmatured sap suddenly expanded by severe freezing, as occurred on the 18th of December, 1884, I think, is what did nearly all the damage, and might have been ameliorated by early cultivation, followed by buckwheat or rye in the fall. Though I know but little personally of the previous condition of your lamented, lost and crippled orchards, I will venture to doubt their thrifty growing and bearing condition at the time, if the winters had been as notable for mildness as they were for severity. I think it far more probable that they were in that semi-dying and despairing condition, so conspicuous in all my observations, and if so, you will surely not contend that the starving process I have tried to describe was a success in preserving your trees. On the contrary, you will concede that a tree which has been barely able to keep alive on its scanty rations for years, must be more susceptible to abnormal hardships, just as a calf, or a man can better resist vermin, disease or cold when well fed, and that possibly you hastened their early departure by omitting what you might have done for them. I heard of an orchard last winter, less than sixty miles north of me, which the owner had despairingly grubbed out at sixteen years old, because the trees were nearly all dead or dying. That man honestly believed that nothing but the Arctic winters killed his orchard, while I just as confidently believe that he ignorantly starved it to death, and at worst he is but little worse off than many others whose orchards insist on a prolonged agony.

Young trees, especially in the nursery, are far more subject to winter-hurt than old orchard trees. I well remember reading and hearing it spoken of at Kansas City, when the Mississippi Valley Horticultural Society met there, that young orchards and nurseries had been extensively damaged by bark-bursting in Arkansas, and I think Texas, a few years before. I have not since heard that they abandoned orchard planting or waited for iron-clads to be imported and tested or grown from seed. I do not mean this allusion as any slur on these efforts, but I cannot afford to wait for such far-off demonstrations. And, besides, though I confidently hope for final success in finding trees that will go to rest at proper seasons and not be awakened by delusive sunshine and showers in the fall; yet I have no hope whatever that any variety of apple will ever be found that can thrive in grass sod indefinitely. We will always have to see to it that our trees make a normal, healthy growth, not excessive, especially in the fall, but not less than six to twelve inches on main terminals.

This is the main base of my hope for success in orcharding. I am sorry and chagrined to think that I have never seen an old

orchard continuously managed as I propose, and wellnigh despair of finding any this side of Michigan or New York, where I think they must be found, at least here and there. I have, however, some reliable accounts of orchards continually increasing at the age ours usually begin to decline. What I call my old orchard, of thirty acres, is only ten years old. A neighbor planted forty acres at the same time, which has only been cultivated in part, though about like the average. He had some fruit several years before I had any, but my first crop more than doubled all he had had then, and each crop since has more than doubled his. The stems and tops of my trees are one-third larger than his by actual measurement, although I have trimmed them up to five or six feet high, but for which they would doubtless have been some larger. I have lost more trees by winter-hurt than he has, especially where I cultivated rather late in the fall of 1884, but counting in all other causes, which constantly occur, I have eighty per cent. of the first planting yet in bearing condition, which does not at all discourage me.

As I have called cultivation the base on which my hope of success rests, I will call pruning one of the mainstays, and will call your attention to it, because it is about universally neglected and requires the next most labor. A man who will guard well these two points needs not often be reminded of rodents, insects, etc.

Nature is always profuse and lavish in her provisions for increase and against contingencies. Every bud is capable of making a branch, and, as there is plenty of room the next spring, a larger number start out than will be needed in the future. Many of this surplus nature will soon try to suppress by overshadowing and withholding sap, but they obstinately refuse to surrender, and insist on dividing the common stock of nutriment, and compelling their rivals to await their company, until they are entirely too crowded, and even generous cultivation and manuring could hardly furnish enough nutriment to go around in liberal measure. We are put here to dress and keep them, or to assist nature in her efforts to suppress this surplus, and not to wait for her to do it. Take a tree that was properly thinned out in planting and has made one year's good growth in the orchard, the first thing I would have in view would be to get a sufficiently high stem. Many of our folks are disgusted with low-headed trees. As soon as I could obtain a desirable stem and corresponding top, I would thin out all branches that a mental picture of future shape would show to be superfluous. Never cut off the leader, unless it threatens to grow out of balance, and then try to have another take its place. Never tolerate a fork, but cut out one prong at first sight. Follow out every branch and thin out the sub-branches, as indicated for the leader, and it will never become such an immensely bushy mass as we generally see, and you will seldom need to make any large wounds or severe drains on the tree or checks to its growth.

Prof. Burrill — This is a valuable paper, and applies to Illinois as well as Missouri. I do not say commence cultivating late, but if the orchard has been properly cultivated early, late cultivation will not be injurious. If trees have made a normal growth there will be little danger of a second growth.

J. Webster — I think we have overlooked this question of cultivation, and stopped the plow and cultivator in July or August, just when it was needed most. Constant cultivation, till the wood is perfectly ripened, is what we need.

H. E. Van Deman — If we were to draw a life-like picture of the average Illinois orchard, it would be in a wheat field, or planted in the spring in the corn field, and in a year or two seeded down to timothy, and mown, or used for a pasture. It is absurd to expect an orchard so treated to thrive and be healthy. We might as well expect a horse or cow to live and thrive without any feed.

Mr. Webster — Our Southern Illinois orchards are starving to death.

H. D. Brown — I don't like the direction this discussion is taking, for if this advice was followed, but few trees would die, and the nurseryman's business would be injured. But very few will follow it, and I do not think we need to feel any special anxiety.

The committee to whom was referred the President's Address and Secretary's Report, submitted the following:

## REPORT OF THE COMMITTEE ON PRESIDENT'S ADDRESS, AND SECRETARY'S REPORT.

Your committee, to whom was referred the President's Address and Secretary's Report, approve the President's recommendation in relation to establishing Horticultural Experiment Stations in different geological and climatic sections of the State. We believe such stations should be established at once, and as soon as our funds will permit, we think from one to three hundred dollars should be expended for this work. The President well says, we need more members and more young men to help on our work. To secure this desired end, we should first enlist our wives and daughters, then the boys will come in. We commend the Board for their action in the past, and urge that in the future they continue to give the ladies a prominent place in our field of labor. We also heartily approve of the plan of introducing music into our meetings, and think it will have the effect to interest the young people in our work.

Referring to the Secretary's Report, we heartily approve the effort to secure an earlier publication of our volume of transactions. We commend the efforts of the Board in striving to secure a larger appropriation for the more successful prosecution of our work, and urge them to continue the effort. We approve the plan of the Secretary to divide the State into districts, with an *ad-interim* committee in each district; giving the committee power to appoint sub-committees. We think this plan would reach the people and bring our work to their notice better than any plan we have tried. We would therefore recommend that the matter be referred to the Executive Board, that they may perfect the plan and adopt it in place of our present *ad-interim* work.

If we had a larger appropriation of money it would be a good way to advance the horticultural interests of the State to hold a summer meeting, but in our present financial condition we doubt the advisability of incurring this additional expense, especially while the Northern, Central and Southern societies hold annual meetings, and we would not think it advisable to hold a State meeting in connection with one of the local societies.

We approve the effort of the Secretary to bring about a hearty and cordial coöperation between the State Boards of Agriculture and Horticulture, and commend him for sending horticulturists to participate in the Farmers' Institutes, being held in the various Congressional Districts of the State.

H. M. Dunlap,
A. G. Humphrey,
C. N. Dennis,
*Committee.*

On motion the report was adopted.

The other committees reported as follows:

## REPORT OF AWARDING COMMITTEE—CLASS II.

*Best Plate Seedling, Good Enough to be Recommended*—There were four entries. First premium was awarded to C. B. Rockwell, Hamilton. A. H. Gaston entered the Hennepin Apple, and W. R. Crain a variety known as Cache. These varieties were regarded by your committee as new varieties, and not as seedlings, inasmuch as they had been passed upon as seedlings, at previous meetings of this Society. No second or third premiums were awarded for the above reasons.

*Best Plate New Variety, Good Enough to be Recommended*—First premium, W. R. Crain, variety, Cache; second premium, A. C. Hammond, variety, Wythe; third premium, A. C. Hammond, variety, McClellan.

*Best Peck of Apples for Central Illinois, Quality to Rule* — First premium, A. C. Hammond, variety, Red Canada; second premium, C. B. Rockwell, variety, Winesap.

H. E. Van Deman,
Milo Barnard,
H. M. Dunlap,
*Committee.*

REPORT OF AWARDING COMMITTEE — CLASSES I AND III.

*Best Five Varieties Winter Apples for Central Illinois, for Market* — First premium, C. B. Rockwell; second premium, J. T. Johnson.

*Best Five Varieties Winter Apples for Southern Illinois, for Market* — First premium, W. R. Crain; second premium, E. A. Riehl.

*Best Three Varieties Fall Apples for Central Illinois, for Market* — First premium, C. B. Rockwell; second premium, A. C. Hammond.

*Best Three Varieties Fall Apples for Southern Illinois, for Market* — First premium, W. R. Crain.

*Best Plate Winter Apples for Northern Illinois, for Market* — First premium, L. R. Bryant, variety, Willow Twig; second premium, E. W. Bryant, variety, Willow Twig.

*Best Plate Winter Apples for Central Illinois, for Market* — First premium, A. C. Hammond, variety, Ben Davis; second premium, J. T. Johnson, variety, Ben Davis.

*Best Plate Winter Apples for Southern Illinois, for Market* — First premium, W. R. Crain, variety, Wine Sap; second premium, E. A. Riehl, variety, Ben. Davis.

*Best Plate Winter Apples for Northern Illinois, for Family Use* — First premium, L. R. Bryant, variety, Jonathan.

*Best Plate Winter Apples for Central Illinois, for Family Use* — First premium, J. T. Johnson, variety, Westfield Seek-no-Further; second premium, A. C. Hammond, variety, Wythe.

*Best Plate Winter Apples for Southern Illinois, for Family Use* — First premium, W. R. Crain, variety, Wine Sap.

*Best Plate Fall Apples for Central Illinois, for Family Use* — First premium, C. B. Rockwell, variety, Bellflower. None worthy of second.

*Best Plate Fall Apples for Southern Illinois, for Family Use* — First premium, W. R. Crain, variety, Rome Beauty. None worthy of second.

*Best Plate Winter Apples for Family Use, Quality to Rule* — First premium, C. B. Rockwell, variety, Winter Pippin; second premium, W. R. Crain, variety, Wine Sap.

*Best Plate Fall Apples for Family Use, Quality to Rule* — First premium, Jacob Auer, variety, Jonathan; second premium, C. B. Rockwell, variety, Bellflower.

*Best Plate Ben Davis* — First premium, L. R. Bryant; second premium, A. C. Hammond.

*Best Plate Willow Twig* — First premium, E. W. Bryant; second premium, L. R. Bryant.

*Best Plate Rome Beauty* — First premium, C. B. Rockwell; second premium, J. T. Johnson.

*Best Plate Jonathan* — First premium, Jacob Auer; second premium, L. R. Bryant.

*Best Plate Rawle's Janet* — First premium, C. B. Rockwell; second premium, J. T. Johnson.

*Best Plate Wine Sap* — First premium, W. R. Crain; second premium, E. A. Riehl.

*Best Plate Smith's Cider* — First premium, J. T. Johnson; second premium, Jacob Auer.

J. Webster,
J. V. Cotta,
Len. Small,
*Committee.*

## REPORT OF AWARDING COMMITTEE, CLASS IV.

*Best Plate of Any and All Valuable Varieties of Apples* — Fameuse : first premium, C. B. Rockwell ; second premium, J. T. Johnson. Stark : second premium, A. C. Hammond. Gilpin : first premium, E. A. Reihl ; second premium, C. B. Rockwell. White Winter Pearmain : first premium, C. B. Rockwell. Spark's late : first premium, W. R. Crain. Cache : first premium, W. R. Crain. Shockley : first premium, W. R. Crain. Fink : first premium, W. R. Crain. Striped Pearmain : first premium, W. R. Crain. Baccolenins : first premium, W. R. Crain. Wiley : first premium, W. R. Crain. Pickett's Late : second premium, W. R. Crain. Egyptian Queen : second premium, W. R. Crain.

The thirty-two varieties of French apples exhibited by Jules Charpentier, of Basco, are very creditable in appearance with few exceptions, and we are of the opinion that some of them may be valuable.

H. E. Van Deman,
Chas. Patterson,
S. G. Minkler,
*Committee.*

## REPORT OF AWARDING COMMITTEE ON NOS. 36 AND 37.

*Best Gallon Sweet Cider*— First premium, A. C. Hammond.

*Best Sample Cider Vinegar*— First premium, F. C. Johnson; second premium, E. A. Riehl.

H. M. Dunlap,
E. W. Graves,
B. C. Warfield,
*Committee.*

## REPORT OF AWARDING COMMITTEE NO. 38 AND CLASSES V AND VI.

*Best Display of Fruits, Appearance of Specimens and Arrangement of Collection to be the Standard*— First premium, Delano & Son; second premium, James T. Johnson.

*Best Plate of Any and All Varieties of Pears*—Lawrence: first premium, A. C. Hammond. Winter Nelis: first premium, A. C. Hammond. McLaughlin: second premium, A. C. Hammond. Howell: first premium, E. A. Riehl. L. Bonne: first premium, E. A. Riehl. Mt. Vernon: first premium, E. A. Riehl. Duchess d' Aug: first premium, E. A. Riehl. Easter Beurre: first premium, S. F. Conner.

*Best Plate of Any and All Valuable Varieties of Quinces*—First premium, E. A. Riehl.

*Best Plate of Any and All Valuable Varieties of Grapes*—Concord: first premium, F. W. Poscharsky; second premium, A. C. Hammond. Niagara: first premium, E. A. Riehl. Worden: first premium, E. A. Riehl. Woodruff: first premium, E. A. Riehl. Cynthiana: first premium, E. A. Riehl. Jewell: second premium, E. A. Riehl. Early Victor: second premium, E. A. Riehl.

*Best Display of Evaporated or Dried Fruit by an Amateur*— First premium, C. B. Rockwell; second premium, J. S. Browne.

*Best Half Peck Early Potatoes*—First premium, J. S. Browne; second premium, F. W. Poscharsky.

*Best Half Peck Potatoes for Winter and Spring*—First premium, J. S. Browne; second premium, Jacob Auer.

*Best Three Heads Celery*—First premium, F. W. Poscharsky.

*Best Collection Sweet Potatoes*—First premium, E. A. Riehl.

*Best Half Peck Sweet Potatoes*—First premium, J. S. Browne; second premium, E. A. Riehl.

*Best Half Peck Parsnips*—First premium, C. B. Rockwell.

*Best Half Peck Carrots*—First premium, C. B. Rockwell.

*Best Winter Squash*—First premium, A. H. Gaston.

*Best Head Cabbage*—First premium, F. W. Poscharsky.

T. E. Goodrich,
H. D. Brown,
Benj. Buckman,
*Committee.*

The following notes of their methods of growing sweet potatoes and celery were handed in by E. A. Riehl and F. W. Poscharsky.

## GROWING AND KEEPING SWEET POTATOES.

BY E. A. RIEHL, ALTON.

The sweet potato is a tropical plant, which fact should be borne in mind in its treatment. It will not grow and thrive unless the weather is warm. A cold spell after it is planted out will so check it that it will not produce near so good a crop as plants put out later, and many plants will die entirely. It is therefore not best to be in too great a hurry to bed the seed in the spring. I prefer the second or third week in April, so as to have the plants ready to plant out about the middle of May to middle of June, and often plant in July with good results. The seed should be bedded in a hotbed, say about April 15. The best bed is one made of horse manure, about ten to twelve inches deep. When the manure is deeper the beds are apt to become too hot and continue warm too long, forcing the plants too rapidly, they thereby becoming drawn and soft, wilting badly when planted out. For covering, I prefer muslin stretched and tacked on frames about the size of a hotbed sash.

The soil should be put in good condition by repeated plowings and harrowing, and the ridges be freshly thrown up at the time of planting. Planting is best done with a mason's trowel. The planter straddles a row, takes his trowel in one hand and the plant in the other, thrusts the trowel into the ground in a sloping position, opens the hole by pulling and lifting the trowel a little, so as to open the hole all the way down, thrusts the plant into the hole with the other hand, removes the trowel and, with the hand that holds the trowel, firms the plant, putting his weight well on in doing so. An active man can in this manner plant as fast as another can drop the plants. A dibble should never be used, because a careless hand is apt to close the hole made on the top and leave the roots in a hollow cavity. I had one lesson that way that cured me most effectually from planting with a dibble.

If the plants are put out in warm weather, on ridges freshly made, they will soon start to growing, and grow rapidly. As soon after a rain as the weeds can be seen, the ground should be stirred to destroy the weeds. For this purpose I have a harrow cultivator that fits the ridges, and does excellent and rapid work, and usually one working is sufficient.

If the plants are put out too early they will grow slowly, and it will be necessary to go over them oftener. The weeds should never be allowed to get over an inch in height.

I never pull up the vines to prevent rooting. I do not think the rooting injurious, and the pulling up the vines a waste of time;

in fact, a damage, in that there are many leaves destroyed by being broken, and every leaf destroyed is a damage.

The crop should be harvested before hard frosts are expected. Care should be used not to cut or bruise the tubers, for such injuries will be apt to induce decay.

The conditions for successful keeping are, careful handling and a uniform temperature of from forty-five to sixty degrees Fahrenheit.

The Yellow Nansemond is the most saleable and most planted variety in the north.

Southern Queen is planted some for early, but it is so poor in quality that it should be discarded.

The Yellow Strasburg is the best early in my estimation. In habit of growth it resembles the Bermuda, of which it is no doubt a sport; is as early and productive but of better quality.

The Bermuda is grown for early, but having no good points not possessed by the Strasburg it should be discarded.

The Jersey Red does well on prairie soils, where the Nansemond does not. I consider it only second rate in quality, but by many it is considered very fine.

For my own eating I prefer the Brazil. I consider it by all odds the best sweet potato I have ever grown, and no other is ever used on my table, so long as we can get it. It is one of the most productive, growing to a large size. Being white, consumers take it to be Southern Queen, and will not buy except where the grower has made a market for it.

## CELERY—PRINCETON FAVOR.

A new variety, named and grown by F. W. Poscharsky, in the year 1887. The seed was sown early, in a hotbed, and transplanted in the hotbed in April, and in June planted in the open ground and cultivated shallow, and in autumn the blanching process was begun by earthing up.

F. W. POSCHARSKY,
*Princeton.*

W. A. Herring, of South Allen, Mich., made an exceedingly creditable exhibition of cider jelly, made from pomace, apple butter and boiled cider. Mr. Herring has made a specialty of this industry, and built up an extensive business.

J. A. Spear, of Cedar Falls, Iowa, placed on exhibition plum butter and canned plums, of a native variety, that he has been cultivating for several years. The quality was excellent, and if the tree proves to be as hardy and productive as Mr. Spear thinks it to be, it will be a valuable acquisition to our hardy fruit list.

SECRETARY.

The committees appointed to recommend lists of apples for planting in Northern, Central and Southern Illinois, reported as follows:

## LIST OF APPLES RECOMMENDED FOR NORTHERN ILLINOIS.

### SUMMER.

*Benoni* — One of the best for dessert, tree hardy, good bearer.

*Duchess of Oldenburg* — Tree hardy, good bearer, fruit fair and good for culinary purposes. Saleable.

### FALL.

*Maiden's Blush* — Tree half hardy, good bearer, good for dessert, culinary purposes and market.

*Cayuga Red Streak* — Tree half hardy, good grower, good bearer, good for eating out of the hand and cooking. Very saleable, never refused on the market.

*Fameuse or Snow* — Tree hardy, season between fall and winter, good.

### WINTER.

*Jonathan* — Best for dessert, early winter. Tree reasonably hardy, should be gathered early.

*Ben Davis* — Not the best quality, tree tender, good bearer, saleable. His hide sells him; there are dollars and cents in him. We can afford to lose the trees every fifteen years.

*Willow Twig* — Tree hardy; good bearer; fruit best after March.

*Wealthy* — Tree hardy; very fair saleable fruit; productive and profitable.

*Roman Stem* — One of the best quality, especially for use in the family.

S. G. Minkler,
Milo Barnard,
Arthur Bryant.
*Committee.*

C. N. Dennis — Judging from appearance of tree and fruit, Plumb's Cider is a valuable apple for the North.

J. V. Cotta — They are not a success, either in tree or fruit; trees are not hardy and the fruit is poor in quality.

Milo Barnard — Some apples that are of no value in my orchard are doubtless of much value in some other locality.

S. G. Minkler — Yes! for my own county—Kendall—if I was a nice young man I would plant my own orchard largely of Twenty-ounce Pippin. It is first-class in all respects, with us, large, handsome, of good quality, and so fine in appearance that it will sell when other varieties are a drug in the market.

Question — Are your trees young, or old ? Answer — They are twenty-five years old.

H. D. Brown — Some varieties do best on sandy land, others on clay. The Rome Beauty delights in a sandy soil.

Len. Small — We should recommend very cautiously. Some of the list I denominate as doubtful.

## LIST OF APPLES RECOMMENDED FOR CENTRAL ILLINOIS.

### SUMMER.

*Red Astrachan* — For family and market. Tree hardy, fair bearer, good market apple.

*Benoni* — Good eating and cooking apple; family use. Tree hardy, productive, long season.

### FALL.

*Maiden's Blush* — Tree moderately hardy, productive. Family and market.

*Stanard* — Tree moderately hardy, very productive. Fruit good size, showy. Family and market.

*Ramsdell's Sweet* — Tree hardy, productive. Fruit high colored. Family and market.

### WINTER.

*Ben Davis* — Tree moderately hardy, productive. Market.

*Willow Twig* — Tree hardy, productive. Mainly for market.

*Minkler* — Tree hardy, moderately productive. Family.

*Grimes' Golden* — Tree hardy, productive, season early winter, quality excellent. Family and market.

*Jonathan* — Tree moderately hardy and fairly productive, quality excellent. Family and market.

### RECOMMENDED FOR TRIAL.

Extra Early — Yellow Transparent.
Fall — Wealthy.
Winter — Wythe.

H. D. Brown,
Benj. Buckman,
H. M. Dunlap,
*Committee.*

A. G. Humphrey — With me Roman Stem is hardy and prolific, and of more value to the orchardist than all of the list recommended.

## LIST OF APPLES RECOMMENDED FOR SOUTHERN ILLINOIS.

EARLY SUMMER.

Benoni, Red Astrachan, Cornell's Fancy.

LATE SUMMER.

Early Harvest, Red Streak, Lowell, Chenango Strawberry.

FALL.

Jonathan.

WINTER.

Ben Davis, Minkler, Wine Sap, Rome Beauty.

RECOMMENDED FOR TRIAL.

Fink, Neal's Keeper, Cache, Picket's Late.

J. WEBSTER,
J. N. FITCH,
J. S. BROWNE,
*Committee.*

Mr. L. R. Bryant — The Illinois State Horticultural Society is here by invitation of the citizens of Princeton and Bureau county. They come among us to do us good. We should now do something for our own good. This we can do by adding our membership to the Society.

Mr. S. G. Minkler — This is a missionary work; the members who come among us make this book — (holding up a volume of the Reports) — they do it at a cost to themselves of ten dollars per volume, for every volume they get for their own libraries, and yet they offer it to you for a membership — only one dollar — and they promise you two volumes per member for regular attendance. We need increased membership. We want folks to become more interested in horticultural improvement, and home adornment.

ARBOR DAY.

H. M. Dunlap — The committee for Central Illinois recommend the second Monday of April for Arbor day.

Milo Barnard — Is not Saturday more appropriate for the children ?

Dr. A. G. Humphrey — All we need to do is to name the time in the month, not too early or too late for our climate.

H. M. Dunlap — I think it should be a school day, and that the teachers should be required to assist, and instruct the children in the art of tree planting. I would ask the committees from the other divisions of the State if the second Monday of April would not do for all ?

C. N. Dennis — Last year, the second Monday of April, we dug into ice; it was too early for tree planting.

H. M. Dunlap — We cannot guard against all the variations of our climate. This time may suit, this year. I therefore move that this Society recommends to the Governor of Illinois the second Monday in April as a suitable day for Arbor day, and that the Secretary be instructed to inform his Excellency of our action.

Motion carried.

F. C. Johnson, Kiswaukee, offered the following

RESOLUTION.

*Resolved*, That this Society request the State Board of Railroads and Warehouse Commissioners to change the classification of cider apples, placing them in Class D.

Adopted.

By request of the officers and members of the Northern Society, President Riehl announced that that Society had concluded not to hold its regular January meeting, but will hold a summer meeting, probably in the month of August.

Adjourned.

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## WEDNESDAY EVENING.

Music.

After calling the house to order the President announced the report of the Committee on

### HORTICULTURAL ADORNMENT OF HOME,

BY MRS. R. D. HARRISON, PRINCETON.

The word horticultural is a very ponderous word. It used to be way over in the back part of my spelling book, along with refrangibility, heterogeneous and predestinarian. In the days when I watered its pages with my tears, horticultural always suggested a

very large pile of big yellow pumpkins. Perhaps that is the reason why, upon reading this programme for the first time, the topic "Horticultural Adornment of Home" brought nothing to mind so strongly as the long strings of pumpkins hung from the rafters of my grandmother's kitchen. On further thought I remembered a house, not a thousand miles from here, whose front yard was last summer adorned with huge cabbages. Light dawned — horticultural adornment then must be the kitchen garden in summer, and the barrels of potatoes and turnips that grace the cellar walls in winter. But, some one suggests trees and flowers, and I immediately realize broad daylight on the subject, and look about for its revelations. The first thing noticed is the "wind-break." In our western climate nothing is so entirely indispensable as a good, long, high, thick wind-break. Dwellers in towns are protected from wintry blasts by the town itself, but country people must provide for themselves a shelter.

Let me warn that young couple just now contemplating a home of their own. Don't let any enthusiast persuade you to leave a wide space for sunset views. It is wonderful how soon you will be content to let the sun set and the moon rise without your personal supervision. But if you live in that home thirty-five or forty years, each lengthening winter will teach you the chilling fact that the wide space left for sunset views lets in an astonishing amount of frost-laden, crack-finding wind. No home can be comfortable unless warm, hence let the wind-break be of the thickest pine and fir trees, many rows deep. As the trees attain years, the lower branches of the inside rows die, and may be cut away, leaving long aisles of impenetrable shade, carpeted and roofed with fragrant pine needles, where one may swing in a hammock, breathing in the "healing" Whittier says is in the pine. One may vary the monotony of the pages of the book in hand by listening to the bird song at his elbow, watching the bit of housekeeping going on overhead, or by catching a bit of a nap to the lullaby of the wind in the branches. With such protection on all windward sides of the house, we can safely plant shade and ornamental trees. This, however, should be done with a sparing hand, for one who plants a tree, watches its growth, enjoys its shade, and eats of its fruit, can rarely be persuaded to cut it down. You and I often see homes where moisture gathers on the walls, the paper hangs in festoons, mould collects, and a musty atmosphere pervades every nook and cranny. Yet the "old folks" charge it to the damp season. Never can they be persuaded that their dear old trees are to blame. So, lest we fall into a like evil case, let our trees be few and carefully placed. We may have shade from groups of trees, where the children can play and the table be set for occasional gala days; but let them be so removed from the house that the sun may bless its roof with purifying and health-giving radiance *all day long.* Variety pleases the eye, and to this end ever-

greens should be mingled with maples, elms, and other deciduous trees. I have seen a weeping birch that, with the growth habit of the weeping willow and the white bark of the birch, is charming. In spring time, it is a fountain dropping emeralds; in winter, when snow-laden, a frozen fountain, graceful beyond telling — *always* it is a thing of beauty. But there is no end to beautiful trees, and each can follow out his own ideal of beauty and fitness.

After the trees are settled snugly in their beds, their roots reaching down slowly but surely into the earth, as if to insure a long life with us, we may turn our attention to the kitchen garden. A well-kept kitchen garden is one of the finest adornments any home can have, and here woman begins work with hand as well as brain. We must leave the work of tree planting to stronger muscles than ours — under our supervision, of course — but when we come to the garden, we may clothe ourselves in suitable garments and be children once more, and enjoy digging in the dirt. And here, oh you town mothers, who come to us country mothers asking that we take your boys onto our farms, right here is your grand opportunity. Have you a garden? Do the boys know about it? We must go with them ourselves, must be personally interested, if we would have the boys enjoy it. Get them to plant and care for lettuce and onions, sweet corn and potatoes. The zest of a boy, when trying to make something grow, is only equaled by his patience in fishing. How your boy's eyes shine, and how big his heart feels, when you say to guests: "Our John raised these vegetables."

Not long ago I heard a gentleman of nearly sixty telling how, when four years old, he planted some squash seeds. Some days after, with the older children, he returned to the spot and one of them called out: "Oh! see, Henry's seeds have come up!" He looked, and there they were, some of them holding up the split shell as if to assure him they were truly his seeds. He added, that to this day he remembered the exultant thrill that filled him to think that squashes would grow for *him*. We are all alike, and your boy and mine has missed something beautiful from life if we have failed to supply him with seeds and a place to plant them. If then, you have a place as big as a bed quilt, take your boys with you and see what wonderful things can be developed from your garden —and your boys.

Literature on methods of work in the garden is so abundant that I shall not risk my reputation in giving advice. You will find more than you will use in almost any seed catalogue. It is easy to step from the useful kitchen garden to the beautiful flower garden. Here is, I suppose, where our friends of the programme committee expect a woman to begin. Unfortunately for those expectations here is where I shall advise small plans, although at the risk of incurring the displeasure of many of Princeton's fair dames. Unless one has a gardener, I should say about flower beds and bor-

ders, as the old bachelor did to his young friend contemplating marriage, "don't." A well-kept lawn is beautiful, but that a lawn sprinkled with floral decorations is beautiful, is not so sure. One is always tempted, in the delightful days of spring, to lay out many times what they have the strength to care for when the heats of July and August come ; so, unless ample help is at hand, we ought not to attempt any extensive out door flower culture. One corner of that kitchen garden devoted to a few choice plants will furnish cut flowers for the season, and be far less exacting in their demands than lawn decorations. We are all familiar with the fascination there is about accumulating plants for winter blooming. We know the woman who adds pot to pot and when they fail, tin cans to the pots, and then tin cans to tin cans, until every window in the living room is effectually darkened by their crowding presence. This woman will take pride in the amount of care she bestows on her plants. I recall a frail woman who, once in two weeks, took down and washed each plant, leaf by leaf, from a large plant stand and bay window, and was always sick the next day to pay for it. Another, who had an ivy of wonderful growth, told me, with an air of satisfaction, that she washed every leaf once a week. You may forgive me — she never did — for asking if she scrubbed the front fence too.

Another evil needs airing in this connection. About bed-time, in many homes, tables and chairs are placed near the fire, and father, mother and all the children take up a line of march, bringing the plants from the cold window to the protection of the fire, for the night. After all are safely deposited and unmovable ones wrapped in newspaper, the family retire. To rest? Not at all, for if the night be cold, ghostly forms emerge from the sleeping-room at sundry intervals to replenish the fire and keep sharp look-out lest any leaf of any plant be frost-touched. This is no unknown picture to many of you, and I say, with all deference to the woman who owns those plants, that it would be better that every pot of them be pitched out into a December night, than that so much of life's strength and comfort be sacrificed to their care. Let no one think I do not love plants and flowers. I do — I have proved it by doing the very things spoken of. But reason has returned; I do so no more. It is high time some one was found brave enough to cross swords with those who advocate decoration and adornment to such an extent. If you and I are to have any comfort in this wide world it will be in our own homes. Let us then have a new declaration of independence: *Resolved*, That since life is short and human strength limited, we adorn our homes with such things — and only such — as do not interfere with the comfort of the family.

Some one says of Sunnyside, Washington Irving's home, that "the sun seemed always to be shining on those walls. Around the house were clumps of shady trees and stretches of rolling sward, traversed by meandering paths. The character of the place was half

wild, half tame, and Irving used to pretend that its rusticity helped to set off the fine landscape gardening of his wealthy neighbors' grounds; but he knew it was the adjoining artificiality which really set off his own bit of nature." Such a home does not spring up in a night like a mushroom. It is as much of a growth as the lives within its walls. One adds to the treasure of tree and shrub, year by year, choosing the best for his own.

It is much the same within doors. We may well make haste slowly in selecting the lares and penates of our homes. An ivy, a half-dozen chosen plants, will give the cherished hint of coming days of green and bloom. But we must never lose sight of the fact that our life is more than meat, and the body than raiment. Thus guarded, it may be said that American homes are the abode of comfort, beauty and happiness.

The subject was continued by the reading of the following paper by

MRS. J. P. LA MONTE, HAMILTON.

*Mr. President, Ladies and Gentlemen:*

When our Society appointed its delegates to this body, I felt quite elated at the honor of being selected on Standing Committee for the State Society. The more I thought of it the taller I grew, until one day it occurred to me to ascertain the duties of a standing committee. Pride must have a fall, and mine certainly had when I found I had the same work to do that our other delegates did; that is, write an essay. I would have certainly declined in favor of some other member of our Society, for we have a number of good essay writers. While grieving over my dilemma I received a communication from your worthy Secretary, asking me the subject of my essay. I took a good hearty laugh at my stupidity, and as he suggested several subjects, I selected one of the number, "Home Adornment." The responsibility of adorning home is generally conceded to woman; and to her is given the credit of its appearance; but I shall take another view of it, and endeavor to show that to truly adorn home the husband has an equal work to do; it is certainly a partnership arrangement — love should be the balance-wheel. Dryden says "Home is the sacred refuge of our lives." If this thought were carried out what adornments home would have. From a horticultural view we will take a couple just starting on a farm. Each is ambitious to have everything in first-class order, but the place is not new, and needs extra work on that account. The busy season is advancing, plowing must be done; well, here is a fence broken, but I must stop and repair it or wife will think I am not tidy — thinks the husband, and a few minutes are taken at once, and it is in order. I must crowd my work to get in the oats early; as he is taking the

horses out of the barn to go to work he discovers a hinge off the door; he hunts up another, puts it on and thus saves the other hinge from being broken; the orchard must be pruned, the garden made, the hedges trimmed, a neat fence or hedge around the yard so wife can have flowers, and with the growing crops what a lovely home we will have when we get it fixed up; we must have a chicken house with a good yard to it, and a shed for the calves; they must be fed so wife can have the proceeds from the butter and eggs to call her own. I must make a strawberry bed and have small fruit of all kinds; it is so delicious when we have been hard at work to sit down to the table with nice ripe fruit and know it is home-grown. Go to this home, where each does an equal part in the adorning, and as you approach the house everything is in order; no broken gates; the hedges are all trimmed; barn, granary and all outbuildings as well as the house nicely painted; nothing discordant; the balance-wheel is perfect. I once heard an essay on this subject from a gentleman, and he made it beautiful; I thought, surely his is a model home, and I made an effort to see it; I thought, surely I have made a mistake when I reached the place, but it was his home; his fences were dilapidated; calves feeding in the yard, and they were quite at home evidently, they were so tame; and the house looked as you can imagine it. The home of which he wrote was some one's else, borrowed for the occasion — another picture. Does it not occur to the farmer, however much work his wife may have to do, the moment she steps out the door if everything is in order, it rests her; if the contrary, she goes back with a slower step, and her mind is filled with the picture for the time, but she is forcibly recalled to her own peculiar domain by the fumes of a kettle boiled dry and part of her dinner spoiled; now, when he, the husband, comes to dinner, he will never imagine for a moment, he is the cause of the disaster; but will think it carelessness, and you see there are two opinions on the subject.

Another day she (as we farmers express it) has her hands full; she discovers the yard full of pigs; she leaves her work to drive them out, and possibly stops to fix the fence; when she returns out of heart as well as breath, and sits down for a moment, she sees her bread running over or her fire gone out and the bread in the oven — in either event it will be spoiled. If her husband knows she has been thrashing pigs he is a wise man not to make any remarks about the bread not being as good as it was yesterday. This is no exaggerated picture, but occurs many days in many a wife's life. I think all will acknowledge the wife bears an equal burden with the farmer. He certainly does not expect to come in and find everything in disorder about the house; then why should it be out of doors. Twice a year the house is thoroughly cleaned; why not the granary, tool house and every other available place be likewise. I know of what I speak, and that it can be done and the pleasure and comfort afforded

thereby. One more picture for your consideration is the overworked wife. She is anxious to do her part; husband wants more buildings and machinery; expenses must be curtailed; he must have help, so she will double her work instead of having a good strong girl to help her. She has been highly educated, and is a very accomplished woman, but has made a drudge of herself until she knows nothing of what is going on around her. Long ago she gave up her music that cost her so many hard hours labor; then her fancy work, that was such a rest to her when she was tired; then her reading—no time for that. Sit down to read when she was through her work and nature would assert herself, and she would fall asleep. After awhile the elasticity is gone from her step, the bloom from her cheek and the sparkle from her eye. Instead of the cheerful singing voice, it is almost a wail; then the health succumbs, and the overtaxed strength refuses to act. The consequence is an early grave or an invalid wife. This is a subject very dear to me, and as I am, fortunately, not one of this class, I cannot leave this subject without this admonition: Remember love is the balance wheel. Make it your business to know she is not working beyond her strength. You will not need to ask; you can tell without a question. Avert the evil while you can control it.

In conclusion: Members of the Horticultural Society are largely farmers. Some of them will spend hours and days to protect themselves against the ravages of the curculio or codling moth, and this is right; but while you are solving this mental problem think of the physical one; of seeing there is plenty of small fruit growing; and please remember an absolute essential to its maturity is a tight fence. In carefully digesting this essay you find my text for "Home Adornment" is: "Two souls with but a single thought; two hearts that beat as one."

Our lives are songs; God writes the words,
And we set them to music at pleasure;
And the song grows glad, or sweet, or sad,
As we choose to fashion the measure.

We must write the music, whatever the song,—
Whatever its rhyme or meter;
And if it is sad we can make it glad;
Or if sweet, we can make it sweeter.

The following on the same subject by

MRS. J. H. ELLIOTT, PRINCETON.

I present to-night a minority report; an excuse for those who adorn their homes with neither the flower, the shrub nor the trailing vine. Profoundly do I believe in homes; very little in what is commonly understood as home adornment. Whose homes are we considering? Our homes. The homes of gardeners, nurserymen, farm-

ers. The homes of more than one-half of the population of this country; the homes of men and women who till the soil for daily bread, working fourteen hours of many a day. The homes of men and women who pay an unjust share of the taxes. We don't hide our property from the assessor, possibly because we cannot. Having admitted that we have little money and less leisure, what adornment for our homes shall we choose? Certainly one — the tree. So friendly in summer. So fine now, in winter, with its delicate outlines; more beautiful in December than in leafy June. If we have been fortunate enough to have a century-old oak, of adornment and respectability, we are at once assured; if not, let us call in the aid of the landscape gardener, and not run the risk of ill-treating a tree by putting it in the wrong place. Let us ask the oak, the elm, the maple, the walnut — any of our native trees — to make their homes with us. This once well done, neither our time nor our purse need be further drawn upon, and we will have secured good neighbors and friends; friends who will bring the best of company to our door — gay society. Seemingly well pleased with life are these strolling minstrels — the birds. In winter we will have the handsome blue-jay, the stay-worn sparrow and snow-bird. In summer, with a host of others, will come the wren, blue-bird, grosbeck, oriole, the dashing cat-bird — sometimes a rogue, sometimes a siren — the thrush, whose song is so sweet that when he sings there is but one song.

Watts' hymns are beyond my criticism, but his bird-lore is faulty. Birds in their little nests do not agree — their home manners had better be hid from quarrelsome children, but their company manners are perfect. They go to your back door only as occasion requires. They don't look askance at an unswept porch, and make you feel the cobwebs over the door; they don't wait for their visits to be returned before coming again. Neither do they ornament their homes. They sing, and then for a time devote themselves to their family, and then sing again. Wise and welcome birds. I prefer cultivating birds to roses. No time, no money needed. Our neighbors, the trees, do the entertaining.

A well-kept lawn is an ornament; an attempt and failure, a positive disfigurement. If we can afford to hire the work done by the day, the lawn will probably be a success. If it is to be done by one of our already over-taxed family, let it be one of the things we can go without.

The reasoning usually is, "The work can be done by the boy of evenings, or on rainy days." The boy — that overworked boy. The boy on a farm is supposed to possess the patience of Job, the strength of Hercules, the wisdom of Solomon, and have all the trades at his fingers ends. If it rains, allow him an undisturbed day with the St. Nicholas. The extra hour had better be spent whistling in the evening sunshine than in rushing a lawn-mower. If we must have the lawn let it be so arranged that we can use horse-

power and not boy-power. We have no time for a flower garden — but flowers are fit for the sick and to carry sympathy when words fail, but they are as sad as beautiful. A sacrifice they always seem; every petal proclaiming, "We all do fade as a leaf." Let others enjoy the house-plant — we don't want it.

I often pity the poor souls who seem to think they prove a love of flowers by giving the sunniest corner of the room to a few struggling plants. By the ardor with which the red spider is hunted, I have sometimes thought house-plants were kept for the purpose of raising spiders. I, too, love flowers; but I will take my message from the hepatica growing in the quiet woods, and not from the stereotyped smile of the red geranium. Into our homes let us not bring anything but the necessities of life — each family deciding for itself. Books may be a necessity for you — a piano for me. If a neighbor finds pictures one of his necessities, and hangs good ones on his walls, let us not be guilty of harboring a chromo. Let us be honest and dare to make our homes like ourselves — not assuming to like what we do not.

There is a plant growing in most of our homes — a much neglected plant in many. A plant not mentioned for discussion by this Society, but spoken of by the Psalmist. "Thy children like thine plants wind about thy table." To the proper culture of this plant let our homes and our time be devoted. In such homes as ours this can best be done. Luxury never helped a child. Necessary as wealth is to the fostering of the arts and sciences, human nature develops best with simple surroundings. Be the home in a palace or a cottage, among icebergs or on the Sahara, these plants, these children should be the chief ornaments. The girls, with their dainty ways, the boys — oh, bless the boys, big or little, rich or poor, black eyes, brown eyes, or blue eyes — I love them all. How they put care at a discount; how they fill the heart with hope; how they rest the tired feet and smooth out the wrinkles. Magicians are they! Most comforting, yet most abused of all God's creation. Who shall be bold enough to sing their praises? Whittier did, but he sung of a barefoot boy. Who will speak a word for the boy with muddy boots?

Who is this boy? In your home your invited guest; in my home my invited guest; into this world of physical pain, mental anguish, hungry children. A doubtful gift!

We hear of the duty of the child to the parent; I doubt if he has any. What can be said of the responsibility of the parent to the child? A responsibility so awful, so overwhelming, that a thoughtful parent must often wish the earth would open and swallow it and him. What have our children a right to ask of us? First, undoubtedly, healthy bodies and minds. Do all children inherit these? The many little ones who come handicapped for life by weak bodies and weaker minds, and tainted moral natures, are a bad answer to

this question. There is but one conclusion — there are not only too many children, but too many parents. I may fail in horticultural orthodoxy, but I still believe in the answer found in the catechism to the question, "What is the chief end of man?" I should change the wording but not the sentiment, I think, and answer, "To be happy is the chief end of man." Remembering always the secret to a happy life was given us two thousand years ago, in the unselfish life of the humble Nazarene; a life so grandly simple we seem scarcely now to comprehend it. To prepare our children to live happy lives is the best we can do for them. With healthy bodies, and eyes and ears trained to know and love the good and the beautiful, they may not upbraid us with having given them life, for the average child is patient and forbearing. The average parent deserves a Siberia. To our children we are often thoughtless, rude, sometimes brutal and insulting; we are, we cannot deny it. We are so because of heavy burdens and unnecessary worry. Therefore, before calling into our homes the care which goes with the beauty of the rose and the fragrance of the lily, let the impatient word disappear; let us learn to be truly polite, loving and lovable to our children. Adorn our homes, we will, to the extent of our taste and time; but let us not fail to adorn also our lives, so that when comes the last of life's tragedy, we may say good-bye with lips innocent of a harsh word, and look into eyes which we have never dimmed.

To the Horticulturists of Illinois, the best of wishes. May their homes possess the true adornment — happy lives.

Music, by the Congregational Church Choir.

## INFLUENCE OF STOCK ON CION, AND CION ON STOCK.

BY PROF. T. J. BURRILL, CHAMPAIGN.

The transmission of the characteristics of the parent to the offspring is one of the most wonderful phenomena in the physiology of plants and animals. At first sight it may not seem so marvelous that one individual should show a decided likeness to another, but when we come to closely investigate what complexities of structure must be duplicated in order that even a remote resemblance can be made, we are led to appreciate the almost miraculous phenomena of reproduction in this respect. If we take two letters of the alphabet, as *a* and *b*, and toss them up we shall not be greatly surprised to find at least half the time that they fall in the order just named — the *a* to the left of *b*. But if we add *d* we shall probably have to toss them up a good many times before we shall find *b a d* spelled out. Now, add another letter, as *e*, and the chances become almost beyond chance that we shall get *b a d e*. If this occurs once, what about the probability of its occurrence a second time? But if the probabilities are one among thousands in the case of a word of four

letters, what short of a miracle must that be should the letters of a poem or an essay thus fall in order, arranged by chance? The complexities of structure of one of the higher plants, such as those we cultivate, is even more pronounced than that of the letters of a book. What infinite possibilities for change in reproduction, yet what closeness of observed similarity! Each plant bears seed after its kind, and from the seed the species is faithfully produced. Parents and offspring do differ, but so little that we recognize without difficulty one from the other. As a portrait painter must take thousands of strokes with his brush to bring out the characteristic features and expression of his subject, so must there be united in the plant organism thousands of details by which, when put together in order, we are able to recognize the general likeness between related individuals.

Yet, however much we wonder at the facts of inheritance, we know that it is a great law of life that like produces like, and we further know that the potency of the phenomenon resides in the substance called *protoplasm*. All young seeds in their earliest state consist of this substance alone. The cell wall develops from it. The whole plant structure owes its origin and development to the marvelous plastic material. No wonder that protoplasm has been called the "physical basis of life." In some way, we know not how, the protoplasm of each specific animal or plant has impressed upon it the peculiar characteristics of that species, or variety. On this property depends the facts of continued identity of individual, and the perpetuity of the species in reproduction. Under the microscope no difference can be detected in the protoplasmic substance of an oak tree and that of the moss that grows on the bark of the former. So far as our best investigations show the structural characteristics of the life-substance, it is exactly the same in Ben Davis and Early Harvest apple trees, yet each is stamped with peculiarities never to be mistaken or confounded.

Now, we must distinctly understand that life is a property of *solid* rather than liquid matter. No true liquid lives. Protoplasm, however soft, is never soluble in the living state. The coherence of its particles is always sufficient to hold it together. It may have the consistency of mucus, but never that of water. Hence, it is impossible that living protoplasm should be carried through plant tissues, with the ascending or descending sap. This latter soaks through the cell walls or adheres to their surfaces. Only pure water and truly dissolved substances can get through the cells of living plants. If protoplasm passes at all from cell to cell it does so by migratory powers wholly peculiar to itself; and while it is now known that it does, sometimes, reach through minute openings in the walls, the distance thus traversed is exceedingly limited. This is why, when two varieties are grafted together, each preserves its own peculiarities. The simple fact that a cion obtains water and dissolved mate-

rials from roots of another variety, is no reason why the cion should partake of the characteristics of the root. Neither is it possible, under the general law of inheritance, for such a root to take the characteristics of the cion because the leaves of the latter elaborate and send down food for the sustenance of the root. If there is any blending whatever in the peculiar characteristics of the cion and the stock it must be by a union of the semi-solid protoplasms of both. This is just what takes place in sexual propagation. In the case of flowers a part of the protoplasmic contents of the pollen grain actually reaches and coalesces with that of the germ cell of the embryo, and the latter partakes of the nature of both elements. From the very beginning this embryo is nourished by the pistillate or mother plant, yet we see no predominance of this latter over the pollen-bearing or male plants. The controlling impress is upon the original protoplasmic parts, and this persists through the life and growth of the individual, with only such variations in size and vigor as difference in nutrition may make. It is well known that cross-fertilization can take place only within very narrow limits of structural variation. Even with very closely allied plants, as the pear and the apple, it cannot be foretold whether or not hybrids can be produced, though experience has made us confident that these can only arise between closely related species.

If now, in the process of grafting similar protoplasmic union does at all take place, we shall look for results closely approximating those of normal sexual combination. The question of graft hybrids really lies before that of the influence of the cion on the stock and *vice versa*. Let us carefully note the difference between simple cellular union, by which a cion may live upon a given stock, and true crossing. In the ordinary methods of grafting the united surfaces are more or less transverse cuts, but there is no reason why the same cellular union should not take place with longitudinal cuts. When it is asserted that the terminal buds of red and blue hyacinths may be split, and the half of one combined with a half of the other, and thus combined grow into a stem with the characteristics of both, this is only grafting with the usual union of cell tissue, and not properly the production of a graft hybrid. Each half of the stem keeps its proper peculiarities, and the only difference from the results of ordinary grafting, is that here the stock and cion grow side by side, instead of one above the other. In a true hybrid, from grafting as well as from pollen fertilization, the characteristics of the two parental forms are blended through and through in the offspring. Remembering the process of sexual union in the flower, no one can assume that the same thing may not take place as a result of grafting. Most assuredly in the fitting of the cion to the stock the naked protoplasm of the two meets and, for all we know, may physiologically combine. If so, there is only needed a bud from the combined portions to give us a true graft hybrid. There is good evidence that

such hybrids or crosses have been produced, notably the Cystisno Adami, so well remembered by the readers of Darwin's "Animals and Plants under Domestication." But I think we may say that such crosses or hybrids are of very rare occurrence and exceedingly exceptional. We do not know of a single instance in which the skill of the grafter can regularly, or even occasionally, produce them, except as a kind of *lusus naturæ*.

But if graft hybrids do occur, they arise from the immediate place of contact between the cion and the stock, just as an ordinary embryo forms where the sexual elements meet and coalesce in the ovary of the flower, not somewhere else in the mother plant. If there is any essential modification of the cion by the stock, or the reverse, it must come from the commingling of the protaplasm of the two, and this is exceedingly improbable at a distance from the graft. It would be rash to say, from the teachings of vegetable physiology, that it does not occur; yet I think we may certainly conclude that it is not a common phenomenon. If there is reason to suppose that graft hybrids or true crosses even between individuals of the same variety are exceedingly exceptional productions, we must infer that this wider influence is still further exceptional. Should it be confidently proved that an essential characteristic of a Porter apple is once changed by grafting on a Red Astrachan stock, this would by no means show that another experiment of the same kind, with all the conditions as nearly alike as possible, would result in the same thing. To make the matter still more uncertain we know that bud variation does sometimes occur on non-grafted plants. The original impress upon the life substance does become modified in ways of which we know nothing. Sports among cultivated plants are not uncommon, yet no one knows how to *make* them appear by any process of manipulation. So, if a grafted stock should show incontestible variation in rare instances, we could not be sure the cion caused the change.

It is, perhaps, necessary here to again exclude the mere changes in vigor shown by plants on different stocks. The stock and cion do have reciprocal influences in the matter of nutrition and peculiarities of growth, fruitfulness and the like. A pear tree on pear roots may grow much larger than on quince roots and be several years later in bearing fruit. A feeble rose may develop into magnificent proportions on a more vigorous stock. Roots may likewise be modified in size and vigor by the change of foliage, etc., as a result of grafting, but these roots will nevertheless preserve their usual habit of growth as to direction and mode of branching. A Bartlett pear cion taken from a quince stock and placed on pear roots shows nothing afterwards of the quince influence. The fact is, in the ordinary methods of propagating apples and pears we confidently proceed upon the assumption that the stock has no real and essential influence upon the cion; otherwise it

would be impossible to keep true by present methods any variety of fruit by grafting or budding. The thousands of seedling stocks on which the Yellow Bellflower varietv has been grown would surely have spoiled the variety if each modified in the least the characteristics of the cion grafted upon it.

Having thus discussed the matter from the theoretical side, let us examine for a moment the supposed proofs of the influence of the stock and cion upon each other. I have searched with some care the literature upon the subject, and find abundant examples cited as demonstrations in favor of the phenomenon. But after carefully weighing the evidence produced, there seems to me but two cases in which the observed change may not be due to simple nutrition on the one hand, or uncongeniality of the union on the other. In all these cases a cion taken from the supposedly modified tree would produce the normal fruit. The two exceptional illustrations are, first, the uniformity of roots of grafted apples, etc., in nursery rows, and, second, the fact that cions taken from plants with variegated foliage and grafted upon green-leaved stocks of same species, so modify the stock as to cause it to put forth leaves showing the characteristic variation.

In regard to the first, may not the rooting of the cion itself perfectly account for the peculiarities of the roots as found in the rows? Surely we need not go further for an explanation, if the roots of nursery trees do mainly come from the cion. The first roots are not to be accounted for in this way, but it certainly is true in many cases, the cion's own roots ultimately equal or surpass those of the stock.

The second case is one of frequent occurrence, and upon numerous kinds of plants. At first sight one would say this is an excellent proof of the direct modification of the stock by the cion, for the variegated twig from the plain-leaved stock may be used for propagation with continued perpetuation of the peculiarity. But such variegation is doubtless disease, and, unfortunately disease is catching. We, therefore, simply prove that a disease is transmissible by inoculation, instead of proving that the cion affects the stock.

It therefore seems that we may at least render a Scotch verdict upon the question, and say "not proved." At the same time, we cannot deny the possibility of the occurrence, at least in some exceptional instances, of a radical constitutional change in either stock or cion from an influence exerted by the one upon the other. If such does ever occur in one direction as from the cion to the stock, we should look for an equal influence the other way.

The subject was continued by the reading of the following paper:

## EFFECT OF STOCK ON CION, AND CION ON STOCK.

BY C. N. DENNIS, HAMILTON.

The effect of stock on cion, to be plainly marked, must be preponderant and complete. And then it is effective, as is witnessed by budding pear on quince, when it becomes a dwarf. But if you bud or graft on a root, and plant so that the cion roots of itself, but little effect will be seen from the root, and even after the tree has been dwarfed by growing a top on a complete quince root if the tree is transplanted and planted deep enough to root from above the union, it will even then partly recover and become a half standard. I fear we are apt to run to extremes or jump at conclusions in this as in many other things. J. G. Vaughn, in his paper read before this Society last year, printed on pages 4 to 7, Vol. XX, Illinois Transactions, after quoting or recording the longevity of certain seedlings in the Miami Valley and Marion County, says "Who can tell how much of the bitter disappointment and actual loss * * * * is directly attributable to the indiscriminate and almost universal practice of grafting into seedling stock of which literally nothing is known," and further on condemns the procuring of seed from cider mills, etc.

Now, who does or can know anything about the hardiness of a seedling until it is tested, any more than they can of the quality of fruit it will bear. And again, a good stock is good even if it did come from a cider-mill. And Vaughn concludes by saying "The remedy is obvious. Tree-planters must be willing to pay a fair price for stock that is worth planting, and purchase only of nurserymen who will use the seed of none but perfectly sound fruit grown on healthy trees of proved hardiness." Thus it would seem that he would have the whole question of hardiness depend upon the stock and not on cion. If this is so, why is Duchess, Tetofsky, etc., any more hardy than Ben Davis and others, which have been grafted on precisely similar stock, for an equal length of time. But J. V. Cotta, in the next paper in the same volume, says "Doctors disagree." And that he has examined a good many of the dead trees, and in every case found the bark ruptured around the stem, and the inner wood deadened, and sums up that it is the kinds that ripen their wood early that withstand the winter's cold; and his remedy is to top-graft on hardy stems, such as Duchess and Whitney, that ripen early from three and a half to four feet high and not higher, and here remember he claims a hardy stock, grown from an unknown seedling, on which to grow a more tender variety successfully.

And I think he is right so far as he goes, viz: The imperfectly completed union of cion and stock invariably produces a hardy tree, or in other words the cion prevails, but in the case where the union is complete, viz: where the cion is compelled to draw all its sustenance through the stock, it is or may be modified by the stock so far as to produce early ripening of the wood, but never far enough to cause the tree to produce apples like the stock.

The influence of cion on stock is more marked or else incalcuably less, for we see whole blocks of trees in nursery grafted on promiscuous roots, and in every case the trees are the same, and if you dig up the tree you find a similarity of root throughout the block. Every practical nurseryman dreads to be compelled to box a lot of Hyslop crab trees because he knows he will have a lot of stiff, stubborn, branching roots, although grafted on cider-mill seedlings.

How far this modification of root goes in trees, where the root and stock are entire, a certain distance above the ground, I am not as well informed as where the line is not so plainly marked; but as the inner part of the tree is practically dead, or the growth is exasmose, and the roots bring up the sap, which is acted upon through bark and leaf by the atmosphere, and again returned to the roots in a modified manner, it is but probable that the root is affected similarly; but although perhaps largely modified, it is never entirely changed, as is shown by the fact that wherever a sprout starts from below the point of union, it is always like the parent. In fact the root, in root grafting, is only a starter, and the cion roots of itself and becomes entirely like cion.

To recapitulate: the stock, if entire, will dwarf or change the habit and size somewhat, perhaps, but never changes the fruit. Apples will be sweet, although budded on sour apple. Pear cions will produce pears on quince or apple stock, and may modify in hardiness, but where the union is imperfect, such as root-grafting, where the cion roots, I think the result nominal or none. I know that Duchess, that have been grafted on promiscuous roots for twenty-five years, are hardy; what it would be in twenty-five hundred years, I have never experienced. And effect of cion on stock is possibly to increase growth and some other characteristics; but I hardly think many of you will ever see so marked an effect as is reported from the æsthetical city of Boston, where it is purported that a young lady got severely burned on her arm, and strips of live, healthy skin were taken from her lover's arm and grafted over the burned place on her arm, and after a complete recovery of her arm was affected, it was utterly impossible for her to resist putting that arm around her lover at every available opportunity.

## DISCUSSION.

Dr. A. G. Humphrey — The May cherry, grafted on Mahaleb stocks, produces much less fruit than when grafted on Morello stock,

or when worked upon its own roots. It is possible, by forcing growths out of the parental form, to make it more liable to freaks of nature — sports.

J. V. Cotta — Last year Mr. Vaughn was pitted against me on top-working. You have read his theory, and if it is correct where are our fruit trees to come from. Now, in our commercial nurseries, all of the apple seeds come from the cider mills, and they are likely to continue to do so for time to come. Some of the Russian varieties are not sufficiently hardy to stand the rigors of our climate; this is being proved every year. We can only get hardy trees by getting hardy stocks; it makes little or no difference as to the root. A tree never root-kills; the trouble is in the stock. Hence, we must grow hardy stocks and top-work with the kind of fruit we wish to produce. [Here the speaker made a number of exhibitions of trees, two of a kind, in each instance one being a root-graft and the other top-worked. They showed the top-worked trees making a better and more healthy growth than the root-grafts.] I have never lost a Willow when grafted on a Milton crab stock.

Mr. J. A. Spear — I top work my trees, and do the work in February; they do better then than later worked. My forte is to graft upon the branches above the fork, a few inches. I give no care to the roots. A tree never root-kills; any root, if healthy, will do; but I use a hardy stock and common grafting wax.

Secretary — The difference between Mr. Cotta and Mr. Spear is, the former trims his stock to a whip before grafting, while the latter does his work above the fork, a few inches; his theory being that he wants a little more of the hardy stock.

J. Webster — The greatest danger to orchard trees comes of bark-bursting, and these plans may be of advantage in preventing this in our severe climate.

H. M. Dunlap — If the top does not influence, how does it happen that there is such an apparent effect upon the growth?

Prof. T. J. Burrill — Some trees grow very rapid only while young; others grow more rapid at a more advanced age. A type of the former is the box elder, and of the latter the hard maple. Some wood is more affected by grafting than others.

## THURSDAY MORNING.

The exercises were opened with prayer by Rev. Heagle.

Music, piano and violin.

### REPORT ON GRAPES. VARIETIES.

BY J. S. BROWNE, ALTON.

*Mr. President* :

In this list I will not endeavor to describe each variety, but only to point out their good qualities and defects, as they have shown themselves during the past season. It would be well, perhaps, to state that they have just gone through one of the most unfavorable seasons that they have experienced for several years. The grapes began to rot almost as soon as out of blossom, and kept it up until they began to color. I will also state that these notes were taken in this locality only.

*Amber*—A sister of Elvira; fruited this year for the first time; did not set well but showed no signs of either rot or mildew.

*Catawba*—The vineyard where this variety was grown had been cut off below the surface of the ground last year, and where the vines were not killed they made a good growth, and this year produced some of the finest clusters I ever saw, entirely free from rot or mildew. This vineyard was some twenty years old and had not been doing well for some years.

*Champion*—All rotten where unprotected by bags; very poor quality and of no value except where earliness is desired.

*Concord*—This variety began the season by mildewing in the bunch, and ended it by about seventy-five per cent. of what was left rotting.

*Cynthiana*—This variety is the most certain to produce a crop of any grape grown here; it makes the best red wine of any on the list; it showed some rot this year, but very little.

*Delaware*—Some few grown here, but is too unreliable for any but the amateur.

*Early Victor*—About a week earlier than Concord; this variety is inclined to overbear; some buds will set as many as five bunches, while four is common. It should be cut short and thinned to two or three bunches.

*Etta*—Has rotted very badly the past two seasons, but previously had done well.

*Elvira*—Skin too thin; cracks badly, and rots as bad as Concord.

*Empire State*—A good grape when you get it, but then you never get it; in three years it has not shown a perfect bunch; rots and mildews in both leaf and bunch.

*Goethe* — One of the finest table grapes grown ; leaf is fairly good ; needs to be bagged to protect it from rot, but is worth all the trouble.

*Green's Golden and Missouri Reisling*— Both from the same lot of seedlings and are equally of no value ; all rotted.

*Hays* — From the same lot of seedlings as Moore's Early ; in growth is about the same ; fruited this year for the first time ; no rot.

*Mason's Seedling* — Foxy in flavor ; at least twenty-five per cent. rotted.

*Moore's Early* — Has rotted but very little ; all ripe and gone a week before Concord is ready to cut ; this grape is growing more and more in favor every year.

*Montefiore* — Of no value ; ninety per cent. rotten.

*Noah* — Another variety of no value ; from 230 vines not a single perfect bunch ; all mildewed in bunch when about the size of peas.

*Niagara* — Not much more reliable than Concord ; over fifty per cent. rotten.

*Perkins* — This variety rotted here for the first time ; at Villa Ridge it is the most profitable grape they have.

*Pocklington* — Worthless ; rots from the time it is out of blossom until ripe ; why anybody wants to grow a grape whose smell brings so strongly to their mind that unhappy aroma that lingers around a small animal of the feline species, I have never been able to understand.

*Vergennes* — This is a fine grape and is a good keeper ; has a thick skin ; vine a little tender ; has to be bagged to protect from rot, or all will go.

*Woodruff's Red* — Another grape that had better have been distroyed instead of being disseminated; rots very badly, smells out loud, and drops from the bunch.

*Worden* — About one-half rotted; does not rot as bad as Concord, and is an improvement on it in every way.

*Wyoming Red* — About seventy-five per cent. rotten, though generally it does not.

*Marsala* — A new variety of merit, that has not been very extensively advertised; bunch and berry large, somewhat foxy; color, a very attractive red; although about ten per cent. rotted this year, one is almost as sure of a crop of this variety as of Cynthiana.

*Jewell* — After seeing this variety fruiting three years, I consider it the best early black grape in the market; extremely hardy; best in quality; equal to the Delaware; ripe when Champion is only colored; inclined to over-bear; requires short pruning and good soil; entirely free from mildew, and as free from rot as the rot-proof Cynthiana; bunch medium, with berry somewhat above medium, and is well worthy a trial.

## DISEASES OF THE GRAPE.

PROF. T. J. BURRILL, CHAMPAIGN.

Professor Scribner, of Washington, D. C., has made special studies during several years upon this subject, and he kindly consented to prepare a paper for the Society. Professor Viala, of France, came to the United States during the summer for the special purpose of investigating the diseases of the grape in our country. It so happened that these two men set out together to visit various parts of the country, from the Atlantic to the Pacific coasts, to become better acquainted with the grape diseases in different latitudes and longitudes. But this journey so delayed the former in his work that he could not prepare the promised paper. I submit his letter:

PROF. T. J. BURRILL,

*My Dear Sir*—My long absence from the department during September, October and a part of November caused such an accumulation of work in my office that it has been practically impossible for me to meet outside engagements. I regret very much my inability to comply with your request for a paper on grape-rot for your Society meeting, but the circumstances are as above stated. I have done the next best thing which suggested itself to me, which is to send you a copy of the new edition of Prof. Viala's treatise on "black-rot," of which I happen to possess a spare copy, together with two communications of my own on "bitter-rot" and "white-rot," published recently in *Colman's Rural World*. I also send with this a copy of a communication just forwarded to the *Botanical Gazette*. It may interest you.

Experiments made this season conclusively demonstrate the efficacy of the sulphate of copper compounds, particularly the *Bordeaux Mixture*, in combating the downy mildew, and it appears evident also that, where the applications were made sufficiently early, they have exercised a restraining influence over black-rot. As soon as the first leaves are fully formed, before the black-rot manifests itself upon them, the application should begin and be persisted in, if the weather is moist, until the period of danger to the fruit is past. The length of time between the first and second applications should not exceed ten or twelve days. With the Veromel or the Vigoroux spraying pumps, these frequent applications are practical even in the largest vineyards.

Simple solutions, of even one pound of sulphate of copper to twenty-five gallons of water, have been found, in many instances, too strong, burning the foliage. The same is true of eau celeste, prepared according to published formulæ. In both cases more water should be added in treating grapes of the Labruska family. The best success has been attained with the Bordeaux mixture, and its continued use is strongly recommended. The inconvenience of application is overcome by the employment of pumps like those above named.

While regretting my inability to fulfill my promise with you, I know that the subject cannot be in better hands nor more ably treated than by yourself. So, wishing you a pleasant and profitable meeting,

I remain very truly yours,

F. L. SCRIBNER.

The copy of Professor Viala's book referred to was received and read with much interest, but this does not seem to be the place for a review of its contents. It is a second edition, bearing the date 1888, Paris and Montpellier, France. Of course, the text in French. But little is given upon remedies.

I submit the copy, showing the progress in the investigations of plant diseases, due to fungi, in the Department of Agriculture at Washington. It is a work that must be of exceedingly great benefit to the country, and especially to all whose business it is to grow plants and crops.

DISCOVERIES AT WASHINGTON.

Among the discoveries of botanical interest as well as practical importance, made through the efforts of the Commissioner of Agriculture the past season, the following may be mentioned :

1st. That of Greeneria. (*G. Fuliginea*, Scribner & Viala) the fungus which causes what grape growers term "*bitter rot.*" The studies of this fungus were begun in the vineyard of Hon. Wharton J. Green, of Fayetteville, N. C., whose courtesy enabled very careful observations to be made upon its external appearance and effects, and, in constituting a new genus upon the species discovered, it was a pleasure to the authors to name it for Mr. Green as a mark of their esteem and respect. Later observations showed this fungus to be widely distributed over the country east of the Mississippi and westward to Texas. Under special conditions it does much damage to the crop, attacking the berries during the period of ripening.

2d. That of *Coniotherium diplodiella*, Sacc., which was first discovered in Italy, in 1879, by M. Spegazzini. In 1885 it was observed for the first time in France. Its distribution in this country is not known, but its present limits seem to be Southwestern Missouri and Northeastern Indian Territory, where it was observed for the first time the present season. Its effect on the berries has led to the use of the term "white-rot" for this disease. In France, the past season, it has occasioned considerable alarm, on account of the extent of its ravages.

3rd. That of "*Pourridie*" or root rot of the grape. The root rot of fruit trees, especially of the pear, has already been noted in this country, but I am not aware that there has been any published notice of the root rot of the vine. This disease was observed in Missouri, Texas and California. It usually appears in low parts of the vineyard, or where the soil is poorly drained, and is especially liable to occur where the land has been recently in forest. It was on land from whence oak trees had been removed that the disease was observed in California. Although the fungi causing the root rot of vines in this country have not been scientifically determined, they are doubtless the same as have been found in Europe, and so well studied by H. R. Hartig and by M. P. Viala, viz : *Dematophora necatrix* or *Agaricus melleus*. Magnificent growths of the latter fungus were seen by the writer, in full development, around dead or dying oak trees near Dallas, Texas. It is possible that this fungus is the cause of the serious losses which the fruit growers about Dallas suffer from the "root rot" of peach and other trees. Efforts are being made to determine whether or not this is the case.

4th. That of *Septosporium Fuckelii*, Thumen. This fungus was found infesting the leaves of *Vitis Californica*, growing in the cañons near Orange, California. On some of the vines the foliage was almost entirely destroyed by its attacks. It is a fungus similar, in its habits and action on the host, to *Cercospora vitis*, Sacc., and its presence need not be regarded with alarm. It was not seen on the cultivated grapes, although it appears to be not infrequent in the vineyards of Europe. The appearance of the upper surface of the leaves attacked, bears a striking resemblance to those infested with mildew (*Peronospora*), but the black spots visible on the under surface at once distinguish it from that fungus.

5th. That it is very doubtful if *Peronsopora viticola* has yet been introduced into California. The districts supposed to be infested with this parasite from the reports received by the Department of Agriculture, were found, upon investigation, to be entirely free from this disease.

6th. That of *Uromyces betæ* on the cultivated beets in Southern California. So far as can be ascertained from available authorities, this is the first discovery of this disease in the United States. It is common in Europe, where it occasions some damage by diminishing the sugar product of the infested plants. It is one of the species whose life history has been fully traced, affording us the knowledge which will enable us to control it, should it become troublesome to the beet sugar interests.

7th. That the stylospores of *Physalospora Bidwellii* may remain intact in the berries, through the winter, and will germinate in the spring when placed in suitable conditions. From this it appears that the ascospores are not essential to the perpetuation of the fungus. The expulsion of the ascospores from their perithecia and their subsequent germination, as seen in the laboratory of the department, has already been recorded.

8th. That *Phollosticta labruscæ* and *Phoma uvicola* are identical, an important fact in considering the question of treatment.

9th. That of finding the mature form of *Ramularia Tulasnei*, or *Sphaerella Fragariæ*. The perithecia, with their fully developed asci and ascospores were found on specimens communicated by Mr. Frank Earl, in the winter of 1886. Later, the fungus was found in all its stages on one and the same leaf. Microscopical preparations have been made which exhibit all the forms in a single section.

10th. That of finding early in December, the living mycelium of *Rœstelia penicellata* in the tissues of apple twigs, and its evident growth from the latter into prematurely forming leaves, for upon the latter, which were scarcely more than an inch in length, well developed spermagonia were noted Dec. 7th. The shoot bearing these leaves had, at this date, been kept partly immersed in water in a warm room for one week. The twigs in question were from a tree which, for a succession of years, has had its foliage badly infested

with the *Rœstelia*. This fact was somewhat surprising owing to its isolated location, far from any Juniperus or cedar. The matter is easily explained, however, if the mycelium of the fungus is perennial within the host.

11th. That *Uredo ficus* is injurious to the foliage of the fig tree in several localities in Florida.

12th. That of finding *Puccinia pruni-spinosæ* attacking the leaves of peach trees in Texas and Southern California, causing more or less injury. This fungus has been found also on the Wild-Goose plum and the native plum in Texas, and on apricots.

F. LAMSON SCRIBNER,

Dec. 8, 1887. *Chief of Section of Vegetable Pathology U. S. Department of Agriculture, Washington, D. C.*

NO DOWNY MILDEW IN CALIFORNIA.

Early in the season of 1886, a circular containing questions relative to the mildews which attack the vine, was sent out by this department to the viticulturists of the country. The replies to this circular from California asserted that the Downy Mildew, or *Peronospora*, of the vine, prevailed to an injurious extent in the southern part of that State and also in the region north of San Francisco, and from this evidence, the supposed infected areas were indicated on the map showing the distribution of this fungus disease in the United States, published in the Report of the Mycologist, in the Annual Report of the Department for 1886.

By the direction of the Commissioner of Agriculture the Mycologist of the Department visited the supposed infected districts in California during the past season, and although careful observations were made, no evidence of the presence of the Downy Mildew were found. The disease which some of the viticulturists had supposed was the Downy Mildew had no connection whatever with that parasite, and the conclusions drawn were that, it is very doubtful if this fungus occurs at all within the State. In view of this, it is strongly urged upon the viticulturists of California to exercise every precaution against the possible introduction of this parasite within their limits, for the injury it would occasion would doubtless be far greater than it is at present in any of the Eastern States, as the varieties cultivated are much more susceptible to its attacks.

It is of special interest to note also that no signs of the black-rot of grapes, the most serious disease of the vine in the states east of the Mississippi, were seen in the vineyards of California. The present immunity from these diseases must not lead the grape growers of the State to a feeling of indifference in respect to them, but render all especially watchful for their appearance, and, upon the first evidence of the introduction of either, employ every effort to destroy them.

F. LAMSON SCRIBNER,

*Mycologist U. S. Department of Agriculture.*

The "Bordeaux" mixture spoken of is made of sulphate of copper, blue vitrol and lime, as follows; Fifteen pounds of sulphate of copper is dissolved in twenty gallons of water, and thirty pounds of quicklime are slacked in ten gallons of water. When the former is completely dissolved and the lime thoroughly slacked and fine, the latter is poured into the copper solution, while actively stirring. A fine blue precipitate settles to the bottom which must be stirred up as applied.

The application may be made with a watering can with fine rose or, much better, with a force pump giving a spray as for poisoning insects.

"*Eau celeste*" or "blue water," is made by putting in a stone or glass jar about four and a half pounds of sulphate of copper and turning upon it three quarts of water. It may be stirred to hasten solution. Add one quart of liquid ammonia, and stir. The result should be a blue liquid, holding in a very finely divided state, the insoluble matter. The above quantity should be diluted so as to make about twenty-five to forty gallons.

There is no longer doubt as to the possibility of destroying the downy mildew (*Peronspora*) with these sulphate of copper mixtures, but further experience is needed upon black rot. In the Champaign district the grapes were, this year, almost perfectly free from disease of any kind, and the quality was never better. The dry season, with an abundance of dear sunshine, seemed to favor the vines and develop the fruit. In some other portions of the State the rot was very destructive. In these localities bagging proved again entirely successful, if early done.

## DISCUSSION.

H. M. Dunlap — Is Vergennes affected with rot?

E. A. Riehl — Everything bagged the first three or four days of June were perfectly protected, while those bagged later were more or less affected.

Prof. T. J. Burrill — Mr. Scribner says a mixture of sulphate of copper and lime applied to the grape as soon as the foliage shows its form, prevents the black-rot. This is the only form of grape-rot that prevails much in this section.

Prof. Van Deman — Prof. Scribner had planned to attend this meeting, but was unavoidably detained in Washington. He desired me to say that he had anticipated much pleasure in making the acquaintance of many of the prominent horticulturists of the West, and that his inability to do so was a great disappointment. Bagging

the grape is practical, but must be done early, even before they are really out of blossom. Many varieties are self-fertilizing. These may be bagged earlier than non-fertilizers.

E. A. Riehl — I put on the bags with a wire.

Prof. Van Deman — Pins are the common fastenings.

H. M. Dunlap — Rubber bands are sometimes used for this purpose.

J. S. Browne — I clip the sides of the bag, so as to lap them over, and pin above the vine.

S. G. Minkler, of Oswego, one of the oldest living members, and for many years treasurer of the Society, asked leave to offer his farewell to the Society. He spoke as follows: "Brothers and sisters in horticulture, fellow members of this Association. The time has come for me to take leave of you all, probably for the last time. This Society was incorporated in the year 1857. It has been my good fortune to be with you, and share in your deliberations, all along the time from that day to this. Your work has been a good one. Its results have been of immense value in the development of the rural interests of the State, and its happy influences are destined to be felt by generations yet to come. In company with others, I, this morning, had the pleasure of a visit to the beautiful and hospitable rural home of the late Arthur Bryant, Sr. What memories must come back to us when we visit that old home. The extent of its plantations; with its trees and plants so rare as to be seldom met with in this latitude, all inspire us with veneration for the planter, and make us feel like saying 'Well done good and faithful servant.' Fellow members, it is for you to perpetuate this good begun work, and bless the world. And now, in sadness I bid you a 'God speed' and an affectionate farewell.

## DISCUSSION CONTINUED.

C. N. Dennis — Is the Worden more reliable, or in any way better than Concord?

E. A. Riehl — It is more difficult to propagate, and is equally liable to rot, still I prefer it because it ripens earlier. It has no faults which Concord have not, and it has some qualities that are preferable. I would plant it for profit.

H. E. Van Deman — It is a promising rival of Concord, but dealers name it Concord to sell it.

Prof. T. J. Burrill — It has been claimed for the Vergennes that it bags itself — *i. e.* its thick skin will withstand fungi and rot.

John Walter, Princeton — I have made observations, from Chicago to Cobden, to ascertain, if possible, the cause and preventative of grape-rot. A board shelter has been found a perfect protection, vines trained under the projecting eaves of a roof, anything that protects from dew, keeps them from rot.

J. Webster — "The old grapevine on the wall" is ever a success, and it is not possible for us to get a hint from these long rumbling, partly protected vines that we may profit by.

## UNSOLVED PROBLEMS IN HORTICULTURAL ENTOMOLOGY.

BY PROF. S. A. FORBES, CHAMPAIGN.

I suppose that most of you are disposed to admit that the horticulturist is dependent, in some measure, upon the economic entomologist for a knowledge of the insect enemies of his products; that there are some indispensible points of knowledge relating to the life histories, habits and treatment of the horticultural insect pests which the ordinary observer cannot well make out for himself, accurate and discreet as he often is, but without leisure for continuous investigation, without a knowledge of the literature of entomology, without the apparatus for experiment, and without a practical acquaintance with the modern methods of observation and research required to unlock some of the more difficult secrets of insect life.

I wish also to admit, on behalf of the economic entomologist, that we are likewise dependent in very many ways upon a scientific horticulture for the success of our studies, and that when we are not strictly so dependent, our labors might often be greatly expedited and greatly increased in fruitfulness if we were permitted to draw freely on the stores of knowledge of the facts of nature which every observant and intelligent horticulturist must lay up. Every one who knows horticulture knows that it is a scientific pursuit, and that the successful horticulturist acquires a very definite scientific training of eye and hand and brain. What a mass of the most valuable material the greatest naturalist of modern times drew from his correspondence with the gardeners and fruit-growers, and collected from the agricultural and horticultural press, every one knows who has read Darwin's "Variation of Animals and Plants under Domestication."

I have hitherto come up to the meetings of this Society — the nearest a general scientific society we now have in Illinois — bringing such contributions to knowledge from my field of labor as the year's work had enabled me to make; but this year I have come to *ask* instead of *give*, and the title which I have selected for this brief paper is that of "Unsolved Problems in Horticultural Entomology." Under this head I have gathered together a few entomological items of practical importance concerning which we much need additional information, and which, as it seems to me, you, as horticulturists, can obtain almost without effort, for yourselves and each other; much more easily, certainly than any one can who does not come in daily contact with with the trees and shrubs of the orchard, and flowers, and plants of the garden.

I first raise the question of the apple aphis. This is a minute, sluggish, bluish green insect, six-legged, usually wingless, about the size, when full grown, of the head of a small pin. It occurs in great numbers on the under side of the leaves of the apple, especially in early spring, causing the leaves to curl. It may be readily distinguished from any other insect with which it is liable to be confounded in that situation, by its sluggish movement, and by two straight, projecting tubes near the hind end of the back. Beneath the head is a stout, jointed beak, which it thrusts into the under side of the leaf, sucking the sap, thus arresting the growth of the cells of the under surface, while those of the upper surface continue to grow. The leaf is thus stunted, and rolled, and curled, forming a protective retreat for the insect colony. The presence of these groups is often betrayed when it would not otherwise be noticed by the occurrence of ants upon the leaves, these insects attending the plant lice, as is the common habit of many of the species, for the purpose of lapping up the sweetish exudation from their bodies. The mischief done, especially to nursery stock, is often very great, and even bearing trees may be so checked as to cause a failure of the crop. The curled and stunted leaves contribute little to the life of the tree, and as the injury occurs when the twigs should be making their most vigorous growth, the result in the nursery may be the practical loss of the season, and the development of a gnarled and stunted stock of little market value.

Although this is a long known species, occurring in both Europe and America; its life history has never been fully made out, neither has any really good method of preventing its injuries yet been devised. Further, the missing facts in its biography are just such as may quite possibly give us the means of controlling the ravages of this species; and they are facts that can hardly be determined by experiment and purposed observation, but, as you will presently see, will probably finally be stumbled upon by chance. The greater the number of intelligent observers, consequently, who will keep their eyes open for these missing data the sooner will this

important problem be disposed of, and this is why I call your attention to the matter now. The history as far as known is this: The species winters on the apple tree either at the base of the buds, or even between their scales, in cracks of the bark and similar situations, and hatches in early spring even before the leaves unfold, and the young lice may often be seen upon the unopened bud as if waiting for the leaves to expand. These young infest the foliage, consequently, from the beginning, taking it leaf by leaf as it is exposed to their attack. All of this generation are females and multiply rapidly, bringing forth living young which in turn rapidly mature and devolop other generations. Then a winged brood appears, which, late in June and early in July, deserts the apple and goes — we know not where. And then nothing more of these lice is known until September, when they again appear upon the apple, — a single winged female here and there upon a leaf. This returning brood brings forth the final generation of the year — now both males and females — and there give origin to the eggs which carry the species through the winter.

The positive facts here given have long been known, both in this country and the old world, but this midsummer absence from the apple seems to have been first noticed in Germany by Dr. Kessler. Our own notes upon the species — principally made this year by Mr. Weed — confirm Kessler's statements most precisely, but throw no light whatever upon the history of the species during the two midsummer months. From the known facts concerning other plant lice related to this of the apple, in whose seasonal history a similar hiatus occurs, it is practically certain that our aphis migrates at this time to some other plant, breeding there for a generation or two in July and August, and that from this plant, whatever it may be, the last brood returns to the apple in fall as described above. The only clue we have to the food plant of this species alternating with the apple is a theoretical one. It is altogether probable that this aphis deserts the apple after the leaves have made their principal growth, for the purpose of satisfying its voracious appetite and maintaining its inordinate rate of increase upon some plant which puts forth foliage more vigorously later in the season, its final return to the apple in fall being clearly only for the purpose of placing its young in position to avail themselves of the early leafage of that tree. Will not you horticulturists do this joint service to horticulture and to entomology; viz: first, to notify me, to observe carefully the apple-louse in spring until you are sure that you know it, and then when it disappears in June or July from your apple trees, watch for the subsequent extraordinary development of a similar plant-louse on other vegetation? And when you think you have a clue, will you not take the further trouble to send us many living specimens for comparison and for experimental use? For here is a point in which the horticulturist is dependent upon the entomologist. They

are almost microscopic insects, and the species are extremely difficult to distinguish one from the other. It would be really impossible for any one but an expert entomologist to identify positively the apple-louse if found on any plant but the apple, and even he would probably withhold a decision until he had verified his conclusion by transferring the insects to the apple, and causing them to breed there and bring forth oviparous progeny. There is this practical point to the question I have raised. It is quite possible that the apple-louse infests in midsummer some worthless plant which could be easily destroyed, and the insect with it, — or that it breeds then on some cultivated plant, the proximity of which to the apple nursery increases the probability of attack by the apple-louse and makes that attack more severe. I add here another suggestion (made to me by one of my assistants, Mr. Weed), that possibly the best time to destroy the apple-louse is in fall, when the last generation of the year are still young and tender on the undersides of the leaves. In spring the young leaves curl so readily when infested that the lice are thus almost wholly protected against fluid or powdery applications, and they then multiply so rapidly, generation after generation, that if only a few are left on here and there a leaf it may be but a little time until they are almost as numerous as before. In autumn, however, the full-grown hardened leaves do not curl, under the plant-louse injury, and there is then but a single generation of the lice followed by the eggs; spraying of the trees at this season with the kerosene emulsion would consequently take much greater effect upon these almost unmanageable insects than it would in spring.

Next I beg to inquire concerning the occurrence of the *apple maggot* in the apples of this State. It has never yet been reported to infest our fruit, although it is one of the worst of the insects devouring the apple in the Eastern States, and is especially destructive at least as far West as Michigan. It has long been known to occur within our limits, feeding here particularly upon the thorn apple or red haw, from which, in fact, it was described by Walsh, twenty years ago, in his first report. It is consequently a very surprising fact that it has not long ago attacked our apple as in the East. The thorn apple is, however, naturally its favorite food, and Prof. Comstock reports an instance where it was found abundantly infesting this fruit near Washington, beside an apple orchard in which no evidence of its presence was detected. Still it must have been shipped in to us repeatedly in the early apples from the Eastern States, and it is quite possibly working us serious injury under cover of the better known damage inflicted by the codling moth. The work of the two species might, in fact, be easily confounded by one whose attention had not been called to the difference. The larva of the codling moth or apple worm is a small caterpillar with distinct head and eight pairs of legs, whereas the apple maggot is footless and headless, pointed at one end and blunt or truncate at the other,

like the blow-fly maggot. The apple worm mines the apple especially about the core; the apple maggot burrows the flesh, hollowing out irregular cavities about the size of a pea, and where there are several of the maggots in an apple at once, these may run together, reducing the greater part of the pulp to a filthy mass.

Has this insect been overlooked by our orchardists, or is there some mysterious barrier of habit or environment which prevents it from entering the apple orchard in this region and restricts it to its native food? This question is especially important to orchardists, because this insect is not amenable to the treatment which we have lately found so efficient against the codling moth. The small, two-winged fly, the adult of the apple maggot, lays its eggs, like the codling moth, in the blossom end of the apple, and from this point the young larva penetrates the apple much as does the apple worm; but this attack is not made until September, and does most damage to the early apples — a season far too late to permit the application of arsenical poisons to the fruit. Will you look at your wormy apples this winter, and watch your fruit next fall, and let us know what you find?

Then what do you know about the plum curculio in the apple? That it deposits its eggs there, and that these may produce an active and voracious larva, some of you know full well. That these larvæ may mature in the apple and give origin to the adult curculio, I have proved repeatedly by breeding it as Walsh did long before me — a fact stated in one of your previous reports; but what percentage of these plum curculios really come to maturity in the apple? If not at least two or three per cent, then this fruit is unfavorable to their development, and any invasion of the apple orchard by them must soon run out, doing only temporary mischief. This is a thing that a number of ordinary observers can help to determine readily and easily, while a single one or two would find it a very formidable task. To eliminate most of the chances of local or temporary influence, will not each of you lend me for a year or two, as you notice the crescent mark and dot of this well-known insect upon your apples, a bushel or more of this speckled fruit? I will then undertake to put it in the best condition possible to breed the beetle, and report to you precisely the result as to the number of infested apples which finally yield the matured insect. This also is a species apparently little affected by such applications of arsenic as we dare make to the apple then, and we need all the more to know the whole truth about it.

Further, there is the question raised by Mr. Weir's observations on the plum curculio in our native plums. As they stand, these observations prove too much, for if only one in thirty-five hundred eggs mature the beetle in the native plum, the curculio could not possibly have maintained itself here under primitive conditions, the female laying at most only about a hundred eggs a year. We must

believe, therefore, either that the observations need corroboration, or that there was some other influence at work detrimental to the curculio beside the mere character of the reaction of the native fruit. And yet these observations are well worth careful testing, and this I should have attempted this year, if the plum crop in our region had not wholly failed. Those who raise plums in any variety can easily help us to a conclusion in this very interesting matter, by simply shipping to us another year speckled plums, native and European. We will then undertake to select those that contain curculio eggs or young; to breed these and to determine how the varieties, foreign and native, compare with respect to the number of curculios matured.

Who knows positively whether it is true that the muck-worms of the compost heap — commonly mistaken for white grubs, and indeed very closely resembling them — really injure vegetation when distributed with the manure?

The red spider sometimes damages the foliage of the apple in this State. Who has seen it? It is well worth while to know how generally this occurs.

Another mite much more minute than this — the grape phytoptus — has been destructive here and there, doing serious but unsuspected mischief in the vineyard. It causes in the Old World one of the common diseases of the vine, and affects here the smooth, thin-leaved varieties, causing the tender leaves in spring to wrinkle and curl, raising the surface in smooth, irregular warts, as if the leaf had been shriveled by contracting all of the vines. This little pest should be as well known to you as to the grape-growers of the other hemisphere. How many of you have it in your vineyards?

The borers of the apple tree have been extraordinarily destructive this year and last, owing, no doubt, to the excessive drouth. How many know whether your trees are worst infested by the round-headed or the flat-headed kind, and whether the soap treatment, which will protect the trees against the latter, will serve for the former also?

How many have noticed in the trunks and larger branches of your plum trees, mining beneath the bark, a pale, reddish-brown, boring caterpiller, about half an inch long, with a dark-brown head and scattered hairs, the body soft and provided with numerous pairs of legs? This is a new thing in the plum; new, also, as to the life history, its species, in fact, not yet determined, and not determinable until bred to the adult. It seems to belong to a genus, one species of which damages the plum in Europe by mining in the alburnum and sap-wood, doing there greater mischief to this and allied fruits. It was received by me August 31, from Mr. Buckman, of Farmingdale, and is now wintering as a living larva, having spun tough protective webs among the rubbish in the bottom of the cage. It is probable, however, that if undisturbed, it would have wintered in its burrows beneath the bark.

## NOTES BY THE SECRETARY.

A. C. HAMMOND, WARSAW.

*Mr. President and Fellow-Members:*—During the past year or two I have been making some experiments in the orchard, the results of which have been very interesting to me, and may be of sufficient general interest to warrant occupying a few minutes of valuable time. I have an orchard of twenty acres, from which I have for some time been taking an annual crop of hay, but discovered that this double drain was telling on the health of the trees and quality of the fruit. I therefore, in the spring of '85, broke it up, and in August sowed it with rye. It made an excellent growth, and by the 10th of June was six to seven feet in height and in full bloom. I then put the plows into it, rigging a chain from the end of the doubletree to the plow, in such a way as to drag it down so that the plow would cover it completely. By the middle of August it had so completely rotted that I found no difficulty in sowing a second crop of rye. This grew more rapidly than the first, and by the 1st of June covered the ground with a very heavy growth, when it was again plowed under. After this it was harrowed and dragged at intervals of three or four weeks during the season. After one or two harrowings it became as finely pulverized as a garden-bed, and so loose that a man in walking over it would sink to his shoe-top.

Samples of soil were taken from this orchard to the depth of two feet, also from a new meadow a few rods distant, and sent to the University at Champaign, where they were placed in the hands of Mr. T. F. Hunt, who carefully weighed and dried, and again weighed them, which gave the per cent. of water in the different samples. That from the orchard above mentioned was found to contain 24.6 per cent. of water, while that from the new meadow near by contained only 12.1 per cent.

Prof. Burrill, in his ad-interim report, will doubtless give us a full account of this interesting and valuable experiment. This orchard produced no fruit, but the trees did not suffer in the least from the severe drouth, but made a strong, healthy growth, and promise a good crop next year.

A year ago I determined to experiment, in the spring, with arsenical poisons; but the bloom was so light that I hesitated to incur the expense, finally concluded to treat one orchard at least. I therefore ordered a Lewis combination force pump and a quantity of London Purple for the purpose. I then took the heads out of two fifty-gallon barrels, and after boring a large hole in each of them, in which I kept a stick for stirring the mixture, I put them in for floats. I then placed the barrels in a wagon and filled them as nearly full of water as practicable, say about forty gallons in each. A pound of London Purple was then thoroughly mixed in a pail of

water and divided between the two barrels, and stirred until the poison was well mixed with the water. I found that two men were needed for the work; one to drive and keep the pail or tub in which the pump worked filled, and the other to use the pump. The driver was directed to drive very slowly along one side of the row and back the other, and the man with the pump, which throws a fine spray fifteen or twenty feet high, to use great caution and see that every part of the tree was reached and so thoroughly wet that the water would drip from the leaves.

The first spraying was done the first and second of June, when the apples were about as large as a half-grown cherry, but I think it should have been done a week earlier, just after the bloom had dropped. The second application was made ten days later.

From these sprayed trees, about three hundred in number, I gathered 500 bushels of apples, from sixty to seventy-five per cent. of which were perfect, and eighty-five per cent. marketable, while from the same number of trees in adjoining orchards, I did not gather a peck of perfect fruit.

This result was astonishing to me, and I have hesitated to publish it, knowing how dangerous it is to form hasty conclusions, but as there is not, in all probability, another orchard in the county that has produced so much perfect fruit, there must be some cause for it; and after carefully looking over the ground, I have concluded that the London Purple saved the fruit.

The mixture that I used was too strong, and scorched the leaves somewhat. Next year I shall use a pound of London Purple to three barrels of water (about 120 gallons), and am inclined to think that even a weaker mixture would be just as good.

With the cheap pump that I used, two men can go over a ten-acre orchard in a day. It therefore seems to be unnecessary for the ordinary orchardist to invest in high-priced machinery for the purpose.

Some of our scientific men tell us that applications of this kind cannot possibly kill the Curculio; be this as it may, the apples in this orchard have for several years been badly stung with this pest, but this season they injured them but very little, and when asked if the London Purple killed them, I can only answer, I don't know. If it did not, why did this orchard show so much less of their work than others.

This experiment has been tried in various parts of the State and, as far as I know, with unvarying success. Hon. B. Pullen, of Centralia, writes: "On account of delay in receiving the pump, I was only able to experiment in a small way; I should have been at work two weeks earlier, but the result was very satisfactory. I used one pound of London Purple to eighty gallons of water and a large spoonful of Paris Green. This was too strong and burned the leaves to some extent. I shall use hereafter about a pound to 150 gallons

of water and no Paris Green. The only marketable fall and winter fruit that I had came from these sprayed trees and, late as it was, and light as the crop promised to be, I am sure that it would have been worth at least $400 had I completed the work, but was compelled to quit to pick strawberries."

It may be that some of my experiments with a number of the comparatively new varieties of apples may be of interest:

*Wythe*—Tree hardy and productive. Fruit large and good in quality. Not valuable for market, but excellent for home use.

*Salome*—Tree perfectly hardy and productive, but fruit rather small and a favorite with the Curculio. Valuable for a high latitude.

*Stark*—A hardy, good-growing tree. Fruit large and good, but rather an uncertain bearer.

*Pewaukee*—Tree hardy and vigorous. Fruit large, but in Central Illinois is a late fall apple, and therefore of little value.

*Walbridge*—One of the hardiest and best trees in the orchard. Fruit small, imperfect and poor in quality. Unworthy of cultivation in Illinois.

*Utter's Red*—This variety in my orchard is utterly worthless.

*Wealthy*—This is one of the most satisfactory trees in the orchard. Fruit handsome and good, but in Central Illinois is a September apple. It should be planted in every family orchard.

*McClellan*—Tree moderately hardy and a handsome, upright grower. Fruit very handsome, perfect and good. It is, however, a late fall apple, which makes it unworthy of being planted in large numbers.

*Hass*—Tree a good grower and apparently hardy, but fruit poor in quality and ripens in September.

*Porter*—This is an old eastern variety, but little grown in the west, but should be more extensively planted, as the tree is hardy and a regular bearer. Fruit nearly always large and smooth.

*Celestia*—A round-headed, slow-growing tree, and appears to be perfectly hardy. Fruit good size, very handsome and best in quality. Season October. It should be in every family orchard.

*The Russians*—What shall I say of them? I have tested many of them, and find that they grow well till they come into bearing, when they almost invariably blight and die.

Even were it possible to grow the trees, the fruit, as I have grown it, is too poor to be of much value. In the hyperborean north they may be grown to advantage, but south of the forty-second degree of latitude they are not wanted.

A number of seedlings that I had collected, and were very promising in both tree and fruit, have proved to be tender, and go down before the winters' blasts, disproving the theory that seedlings possess a greater degree of innate hardiness than grafted trees.

I have before referred to an orchard in Hancock county planted with varieties from Central and Southern Europe. In company with Mr. J. T. Johnson, I visited this orchard again about the 20th of September, and in a trip of seven miles, through one of the best farming townships in the State, we did not see ten bushels of apples until we reached this orchard, which we found moderately full of handsome, high-colored fruit. The trees have passed safely through the late crucial winters, and endured the fearful drouth of the past summer well. Many of these apples are best in quality and beautiful in appearance, and if the trees prove to be as hardy and productive as they now promise, they will be very valuable for the amateur orchardist.

Specimens from this orchard will be found on the exhibition table, and we hope that all interested in apple-growing will examine them.

About the first of June, just before the rot made its appearance on my grapes, I sprayed them thoroughly with a solution of sulphate of copper, for the purpose of testing this remedy. But in a few days after the application the thermometer fell to 58°, a degree of cold that kills the organisms that cause rot, and the experiment was, of course, a failure.

Some of the members of this society have visited the vineyard of Prof. Standish, in Galesburg, and seen the wonderful crops of magnificent fruit that he annually gathers, and have learned that his vineyard is almost a bank of manure. Acting on this hint, I have for three years been trying the plan of covering the ground two or three inches with manure in a small vineyard, with the very best success, the vines bearing very heavy crops of large, fine fruit.

What was the cause of the strawberry failure the past season? The general opinion seems to be that it was caused mainly, if not entirely, by insect injury to the bloom. It occurred to me at the time that it might be caused, in part at least, by the more vigorous growing pistilates, like Crescent, overgrowing and crowding out the staminates, and that the trouble was caused by lack of fertilization. This is a question that should be carefully investigated, and I hope to get some light on it at this meeting.

## DISCUSSION.

F. I. Mann — What is the proper proportion of London Purple to use in spraying fruit trees?

H. E. Van Deman — One pound to 200 gallons of water is strong enough to answer the purpose. If of greater strength the leaves may be injured.

## REPORT OF AD-INTERIM COMMITTEE FOR CENTRAL ILLINOIS.

BY PROF. T. J. BURRILL, CHAMPAIGN.

The thing of paramount interest to horticulturists during the season, was the prolonged drouth extending, with more or less severity, from March until November. The average rainfall in Central Illinois is about 4.98 inches for June ; in 1887 it was but 1.62 inches. For July the average is 2.58 inches; in 1887 it was 1.65 inches. For these two months there was a deficiency of 4.29 inches, or considerably more than half. Together with the lack of rain, the temperature ranged very high, causing unusual evaporation. Many crops failed entirely, and everywhere, after midsummer, the evil effects were very visible. Some other observations were made and recorded for this report, especially the imperfect fertilization of the strawberry, but so important were the studies upon soil during drouth, by Mr. T. F. Hunt, of the University of Illinois, it has been thought best to confine this report to them. At first, Mr. Hunt undertook the work for the Ad-interim Committee, but as he was solely under the pay of the University, it was afterward considered best to issue the matter as a bulletin from the latter. I now extract from that publication :

### METHOD OF PROCEDURE.

An excavation was made a little more than two feet deep, one side being made vertical and smooth. By means of a trowel, made for the purpose, a block of soil three inches square and twelve inches in vertical length was taken out of this side from top downwards. The soil was transferred to a pan and immediately weighed. A like prism from the second foot in depth was then similarly removed and treated. In all cases duplicate samples were taken under like conditions one rod distant. In the table given, each even numbered sample is a duplicate of the preceding odd numbered sample. The unaccented number indicates the first foot, or top soil, and the accented number the second foot, or subsoil.

### EFFECTS OF TILE DRAIN.

After comparing several samples from various situations, and finding some evidence of more moisture in tiled land, a place was sought where all other conditions were as nearly as possible the same. I found the desired conditions on the farm of Mr. E. O. Chester, in Champaign. Running almost parallel in a southwesterly direction at about eighty rods from each other are two depressions in his land which were formerly equally wet. One of these is now tiled, and in all seasons is in tillable condition, while the untiled land is stated by Mr. Chester to be a little troublesome to cultivate in a wet season. These depressions both run through the same oat stubble field

and then pass into broom-corn fields. The soil — the common black prairie loam, was all of the same nature except those differences due to moisture and cultivation.

Here, then, were the desired conditions for a double test of the amount of water in tiled and untiled land.

Nos. 9 and 10 were taken in oat stubble in untiled land. The soil was moderately fine and friable, the subsoil running into the grayish or blue clay near the bottom of the second foot. Nos. 11 and 12 were also taken in oat stubble. No. 11 directly over tile drain and No. 12 one rod from tile drain. No. 11 was of like texture throughout, coarse and lumpy, the grayish clay being mixed with the black loam. No. 12 was rather coarse, the top soil being more friable than No. 11, while the subsoil broke up into angular lumps. No. 11 appeared drier than No. 12. In fact, of the 48 samples I took, personally, the two taken at No. 11 appeared the driest. However it was simply an appearance and not the fact. The per cents of water were practically the same, being 14.0 and 14.4 respectively, while Nos. 9 and 10 had an average of 13.4 or 0.8 per cent. of water in favor of tiled land.

Nos. 13 and 14 were taken in a broom-corn field in untiled land which was in a fine friable condition, while Nos. 15 and 16 were from a tiled field of broom-corn, the soil being in condition similar to Nos. 13 and 14. The untiled land contained 14.7 per cent., while the tile contained 16.4 per cent. of water, or 1.7 per cent. in favor of the latter.

Comparing Nos. 9 and 10 with Nos. 13 and 14, which were taken within four rods of each other, it is found that on untiled land the cultivated broom-corn field contained 1.3 per cent. more water than oat stubble. Comparing Nos. 11 and 12 and Nos. 15 and 16, which were taken within ten rods of each other, it is found that on tiled land the broom-corn field contained 2.2 per cent. more water than the oat stubble.

### EFFECTS OF CROPS AND CULTIVATION.

To determine the different per centages of water in land under different crops and cultivation, tests were made in a corn-field, a blue-grass and timothy pasture, and a clover stubble, all adjacent and in other particulars similar. The soil was the ordinary black loam, running into yellowish clay at the bottom of second foot. The pasture was dried up, the blades of grass being dead from the drouth. The clover tops were still green, making a feeble growth. The corn was fresh and green. The pasture contained 12.3 per cent. and the clover stubble 11.0 per cent. of water, or 1.3 per cent. in favor of the pasture land. Blue-grass and timothy failed to grow in soil containing 9.7 per cent. of water in first foot, where the roots get their main supply, while clover remained green, making a feeble growth in soil containing but 8.8 per cent. of water in first foot. This is in

accordance with the prevalent belief that clover can stand drouth better than blue-grass and timothy.

Comparing Nos. 23 and 24 with Nos. 17 and 18, the corn land is found to contain 4.2 per cent. more water than clover stubble, or comparing with Nos. 21 and 22, 2.9 per cent. more than in pasture field. In taking samples an excavation was made 2 ft. 4 in. deep. An appreciable number of corn roots was found in this depth. It will be noticed that in second foot there is 18.3 per cent. of water, while but 12 per cent. in first foot. These two facts — depth of roots and high per centage of water in second foot in cultivated corn-field — indicates why corn is able to withstand such excessive drouth.

### SOILS FROM MARION COUNTY, ILLINOIS.

It was thought not at all improbable that different soils might give very different results. To test this, samples of the white soil of Southern Illinois were obtained by Mr. G. W. McCluer, of the University, in Meacham township, Marion county, in corn-field, oat stubble, and timber land. The land was not tiled.

Nos. 25 and 26 were taken in oat stubble from which the oats had been cut six weeks. This soil is a light drab clay, almost white, fine and friable, the subsoil being the lighter in color because containing less vegetable matter. Nos. 27 and 28 were taken in a corn-field in which the stand of corn was very light, in fact, a practical failure on account of drouth. Soil similar to Nos. 25 and 26. Sample from oat stubble containing an average of 8.7 and those from cornfield 12.7 per cent. of water, or four per cent. in favor of soil in corn-field. In this test the increased amount of water would seem to be owing to cultivation, as the corn stood so thinly and so small as to cast but little shade.

It was found that stubble land in Champaign county contained 4.3 per cent. more water than in Marion county; and the corn and broom-corn land in Champaign county contained 2.1 per cent. more water than the corn-field in Marion county. There is more difference between the uncultivated than the cultivated land.

Nos. 29 and 30 were taken in timber, consisting mostly of post oak and hickory. The soil was similar to Nos. 25 to 28, except more tough, impervious clay in second foot. There was a little smaller per centage of water in first foot than was found in corn-field, and a little more than in oat stubble. In second foot there was a surprising per centage of water, there being 21.5, while there was but 10.2 in oat stubble and 14.5 in corn-field.

### SOIL FROM HANCOCK COUNTY, ILLINOIS.

Through the kindness of Mr. A. C. Hammond, Secretary of the Illinois Horticultural Society, Warsaw, I was enabled to make farther tests of water in soil under varying conditions.

Nos 31 and 32 were taken in Mr. Hammond's orchard, the soil being a dark, clayey loam, somewhat peculiar to that region. A crop of rye was plowed under about the first of June—as well as the previous year; the land was plowed once afterward and harrowed several times. Nos. 33 and 34 were taken in a new meadow, 15 rods from where samples were taken in orchard, the soil being similar. The soil in the orchard contained 24.6 per cent. of water, while that in the meadow contained 12.1 per cent., or in other words, that in the orchard contained almost exactly twice as much as that in the meadow. In regard to this, Mr. Hammond writes: "This work has been a great surprise to me. In the orchard there was no dividing line between the dry and moist earth, but moisture extended to depth dug, while in every other instance the top was moist two or three inches, caused by late rains, and the rest of the way down it was hard and dry."

Nos. 35 and 36 were taken from potato field of J. T. Johnson on the bluff (Loess soil) overlooking the Mississippi. The soil had received no cultivation except digging the potatoes, since June 1st. Nos. 37 and 38 were taken on similar soil from a wheat stubble field 100 feet distant. The potato field contained 8.0 per cent. of water, while the wheat stubble contained 9.0 per cent. of water, or one per cent. more water in uncultivated fields. The cultivation was not at the right time or of the proper kind to check evaporation in time of drouth.

Nos. 39 and 40 were taken in a corn-field six feet from tile drain. Nos. 41 and 42 were taken 100 feet distant. The land was almost flat, the last mentioned samples being taken possibly six inches higher than those near tile drain. The soil was a clay loam very similar throughout. There was a difference of 5.6 per cent. of water between Nos. 39 and 40. In regard to this, Mr. Hammond writes: "In digging these holes No. 39 seemed to be drier than No. 40, and the weight shows less moisture, but I could see no local reason why it should be so." Of course, this difference between duplicates destroys, in large measure, the value of the results. The samples, however, near tile drain were found to contain on an average 2.1 per cent. more water than those 100 feet from tile drain.

In all the comparisons between cultivated and uncultivated soil there existed certain conditions, the effect of which could not be determined. An old stubble has been exposed a greater or less time to the direct rays of the sun. The stubble may be a protection. How much is unknown. The corn field is shaded by the growing corn, but the latter is rapidly evaporating large quantities of water from its leaves. The amount can be only vaguely estimated. The oat stubble evaporates practically none.

### EARTH IN CANS.

To eliminate these sources of error, I had two cans made, 12 inches deep and 6 inches in diameter, with an air-tight receptacle at

bottom to receive water. Each was filled with the same kind of soil, containing 14.3 per cent. of water. Both were filled with soil, firmly pressed, to within two inches of top, the amount of soil used differing by only three ounces. One can was filled to top with soil firmly pressed and the other filled with loose soil, the latter intended to be cultivated. To each was added two pounds of water, one pound being poured on surface of each and the other placed in receptacle at bottom. Each were then placed in sun, and each lost at end of three days 8 oz. of water. The surface of the one was then cultivated 1½ inches deep daily. At end of seven days the cultivated soil had lost 5 oz. and the uncultivated 9½ oz. of water. The water saved during a week on an acre of land by cultivation would be 30 tons, or would be equal to about one-fourth inch of rainfall.

### LOSS OF WATER BY DRYING IN AIR.

Sixteen samples of soil containing an average of 14.3 per cent. of water were put in pans having an exposed surface of ¾ square foot and a depth of one inch. They were exposed in a still room to the direct rays of the sun, the temperature of the room averaging at mid-day about 90° F. The average loss of water in two days was 6 11-16 oz. or 8.4 per cent. of the weight of dry soil, and 58.7 the total amount of water contained. This gives some idea of the amount of water that must be raised by capillary attraction, during drouth, in order to keep soil in moist condition.

Two pounds of water were applied to each of four samples of dry soil weighing 5 pounds each, and the surplus water allowed to drain away. At the end of eight hours, drainage ceased and there remained from 46.8 to 52.0 per cent. of water, with an average of 49.3 per cent. A saturated soil may contain, therefore, about half its weight in water.

### SUMMARY.

Eighty samples of soil, forty from first foot in depth, and forty from second, taken in Champaign, Marion and Hancock counties between Aug. 1st and 19th, 1887, gave an average of 13.2 per cent. of water. This in two feet of soil is equal to four inches of rainfall or 110,000 gallons of water per acre. This is about equal to the average monthly rainfall in this region, and is over four times the rainfall in Champaign County during the two months previous to making the tests, as reported by the observer for the Illinois State Weather Service.

Forty-four samples taken in Champaign County gave an average of 13.5 per cent. of water. This is a little more than one-fourth the amount contained by a thoroughly saturated soil. Twenty-two samples of first foot contained on an average 12.0 per cent. and a like number of second foot 15.0 per cent. of water. The lowest per cent. of water found in first foot of soil was 8.5. It was found

in two instances—in an oat stubble and a clover stubble. The clover was green and growing, while blue grass and timothy on adjacent soil containing an average of 9.7 per cent. of water, was parched. The highest per cent. in first foot, 16.0, was found in a broom-corn field in two instances, in one instance tiled and one untiled. Twelve per cent was the lowest found in second foot, being in an oat stubble, and 18.4 the highest, being in a corn field.

Comparing the average of 40 samples taken on tiled and untiled land, which are in some measure comparable, there was found to be in two feet of tiled soil 14.1 per cent. of water, and 13.2 in untiled land. In first foot, 13.6 in tiled and 11.3 in untiled; in second foot, 14.5 in tiled and 15.0 in untiled. Comparing Nos. 9 to 16, which for reasons before given are the only samples strictly comparable as to tiled and untiled land, there was found in two feet of soil 15 3 per cent. of water in tiled, and 14.0 in untiled land; in first foot, 14.4 in tiled, and 13.3 in untiled; in second foot, 16.2 in tiled, and 14.8 in untiled.

Fifty-six samples of soil, taken in fields growing cultivated and uncultivated crops, show somewhat more moisture in soil growing cultivated than in that growing uncultivated crops. In two feet deep there was an average of 13.6 per cent. in the soil in cultivated crops, and 11.6 per cent. in that in uncultivated crops; in first foot 12.0 vs. 10.3, and in second foot 15.0 vs. 12.8 per cent., respectively.

In an artificial test of cultivated and uncultivated fallow land, the uncultivated was found to lose nearly twice as much moisture as the cultivated land. The excess of water lost in uncultivated land in one week was equal to a rainfall of one-fourth inch.

[*See pages 108 and 109 for Tables I, II, and III.*]

TABLE I.

*Samples taken from farms of the University of Illinois, and of E. O. Chester, Champaign Co., Illinois.*

| LOCATION. | No. | Weight of Soil. | Weight after Drying. | Loss of Water. | Per Cent. of Water. | Per cent. to depth of two feet. | Average Per cent. |
|---|---|---|---|---|---|---|---|
| University Farm— | 1 | 88 oz. | 78 oz. | 10 oz. | 12.8 | 13.0 | 12.7 |
| Corn field near tile | 1– | 90½ " | 80 " | 10½ " | 13.1 | | |
| drain, Aug. 1, 1887 | 2 | 93 " | 83 " | 10 " | 12.0 | 12.3 | |
| | 2– | 111½ " | 99½ " | 12½ " | 12.6 | | |
| University Farm— | 3 | 84½ oz. | 75 oz. | 9½ oz. | 12.7 | 15.4 | 15.2 |
| Corn field 15 rods | 3– | 95 " | 80½ " | 14½ " | 18.0 | | |
| from tile drain ... | 4 | 71½ " | 64 " | 7½ " | 11.7 | 14.9 | |
| Aug. 2, 1887. | 4– | 91½ " | 77½ " | 14 " | 18.0 | | |
| University Farm— | 5 | 104½ oz. | 91½ oz. | 13 oz. | 14.2 | 14.2 | 13.4 |
| Oat stubble near | 5– | 97 " | 85 " | 12 " | 14.1 | | |
| tile drain, Aug. 2, | 6 | 115½ " | 102 " | 13½ " | 13.2 | 12.6 | |
| 1887 ..... | 6– | 98 " | 87½ " | 10½ " | 12.0 | | |
| University Farm— | 7 | 76½ oz. | 70½ oz. | 6 oz. | 8.5 | 10.8 | 11.1 |
| Oat stubble 10 rods | 7– | 78 " | 69 " | 9 " | 13.0 | | |
| from tile drain ... | 8 | 69½ " | 64 " | 5½ " | 8.6 | 11.3 | |
| Aug. 2, 1887. | 8– | 77 " | 67½ " | 9½ " | 14.0 | | |
| E. O. Chester's Farm— | 9 | 75½ oz. | 67½ oz. | 8 oz, | 11.8 | 13.1 | 13.4 |
| Oat stubble, not | 9– | 71½ " | 62½ " | 9 " | 14.4 | | |
| tiled, Aug. 6, 1887. | 10 | 79½ " | 70 " | 9½ " | 13.6 | 13.7 | |
| | 10– | 82½ " | 72½ " | 10 " | 13.8 | | |
| E. O. Chester's Farm— | 11 | 96½ oz. | 85½ oz. | 11 oz. | 12.9 | 14.4 | 14.2 |
| Oat stubble, tiled, | 11– | 84½ " | 73 " | 11½ " | 15.8 | | |
| Aug. 6, 1887 ..... | 12 | 86 " | 76 " | 10 " | 13.2 | 14.0 | |
| | 12– | 81½ " | 71 " | 10½ " | 14.8 | | |
| E. O. Chester's Farm— | 13 | 83 oz. | 71½ oz. | 11½ oz. | 16.0 | 15.6 | 14.7 |
| Broom-corn field, | 13– | 90½ " | 78½ " | 12 " | 15.2 | | |
| not tiled, Aug. 6, | 14 | 77 " | 69 " | 8 " | 11.6 | 13.7 | |
| 1887 ..... | 14– | 88½ " | 76½ " | 12 " | 15.8 | | |
| E. O. Chester's Farm— | 15 | 80 oz. | 69 oz. | 11 oz. | 16.0 | 16.5 | 16.4 |
| Broom-corn field, | 15– | 93 " | 79½ " | 13½ " | 17.0 | | |
| tiled, Aug. 6, 1887. | 16 | 85½ " | 74 " | 11½ " | 15.5 | 16.3 | |
| | 16– | 96 " | 82 " | 14 " | 17.1 | | |
| University Farm— | 17 | 73 oz. | 67 oz. | 6 oz. | 9.0 | 10.9 | 11.0 |
| Clover stubble.... | 17– | 70½ " | 62½ " | 8 " | 12.8 | | |
| Aug. 10, 1887 | 18 | 89½ " | 82½ " | 7 " | 8.5 | 11.1 | |
| | 18– | 63 " | 55½ " | 7½ " | 13.6 | | |
| University Farm— | 21 | 74½ oz. | 68½ oz. | 6 oz. | 8.8 | 11.6 | 12.3 |
| Pasture ..... | 21– | 76 " | 66½ " | 9½ " | 14.3 | | |
| Aug. 10, 1887. | 22 | 78 " | 70½ " | 7½ " | 10.6 | 12.9 | |
| | 22– | 72 " | 62½ " | 9½ " | 15.2 | | |
| University Farm— | 23 | 73½ oz. | 66½ oz. | 7 oz. | 10.5 | 14.5 | 15.2 |
| Corn field ..... | 23– | 74½ " | 62½ " | 11½ " | 18.4 | | |
| Aug. 10, 1887. | 24 | 72 " | 63½ " | 8½ " | 13.4 | 15.8 | |
| | 24– | 81½ " | 69½ " | 12½ " | 18.1 | | |

## Table II.

*Samples taken from Marion County, Illinois.*

| Location. | Number. | Weight of Soil. | Weight after Drying. | Loss of Water. | Per Cent. of Water. | Per cent. to depth of two feet. | Average Per cent. |
|---|---|---|---|---|---|---|---|
| Oat stubble ..... | 25 | 84 oz. | 78 oz. | 6 oz. | 7.7 | 8.5 | 8.7 |
| Aug. 14, 1887. | 25– | 82 " | 75 " | 7 " | 9.3 | | |
| | 26 | 74½ " | 70 " | 4½ " | 6.4 | 8.8 | |
| | 26– | 80 " | 72 " | 8 " | 11.1 | | |
| Cornfield ..... | 27 | 70½ oz. | 63 oz. | 7½ oz. | 11.9 | 13.7 | 12.7 |
| Aug. 14, 1887. | 27– | 93½ " | 81 " | 12½ " | 15.4 | | |
| | 28 | 74½ " | 68 " | 6½ " | 9.6 | 11.6 | |
| | 28– | 87½ " | 77 " | 10½ " | 13.6 | | |
| Timber ..... | 29 | 81 oz. | 75½ oz. | 5½ oz. | 7.3 | 13.7 | 14.8 |
| Aug. 14, 1887. | 29– | 84 " | 14 " | 14 " | 20.0 | | |
| | 30 | 82 " | 6½ " | 6½ " | 8.6 | 15.8 | |
| | 30– | 85½ " | 16 " | 16 " | 23.0 | | |

## Table III.

*Samples taken from Warsaw, Hancock County, Illinois.*

| Location. | Number. | Weight of Soil. | Weight after Drying. | Loss of Water. | Per Cent. of Water. | Per cent. to depth of two feet. | Average Per cent. |
|---|---|---|---|---|---|---|---|
| Cultivated Orchard... | 31 | 89 oz. | 70 oz. | 19 oz. | 27.0 | 26.7 | 24.6 |
| Aug. 17, 1887. | 31– | 93½ " | 74 " | 19½ " | 26.3 | | |
| | 32 | 88 " | 72 " | 16 " | 22.2 | 22.4 | |
| | 32– | 92 " | 75½ " | 17 " | 22.5 | | |
| New Meadow ..... | 33 | 79½ oz. | 72 oz. | 7½ oz. | 10.4 | 11.7 | 12.1 |
| Aug. 17, 1887. | 33– | 82½ " | 73 " | 9½ " | 13.0 | | |
| | 34 | 77 " | 69 " | 8 " | 11.6 | 12.4 | |
| | 34– | 81½ " | 72 " | 9½ " | 13.2 | | |
| Potato field..... | 35 | 82½ oz. | 77 oz. | 5½ oz. | 7.1 | 8.5 | 8.0 |
| Aug. 18, 1887. | 35– | 83½ " | 76 " | 7½ " | 9.9 | | |
| | 36 | 82 " | 76½ " | 5½ " | 7.2 | 7.5 | |
| | 36– | 84 " | 78 " | 6 " | 7.7 | | |
| Wheat stubble..... | 37 | 86 oz. | 80 oz. | 6 oz. | 7.5 | 9.0 | 9.0 |
| Aug. 18, 1887. | 37– | 84 " | 76 " | 8 " | 10.5 | | |
| | 38 | 83½ " | 76½ " | 6½ " | 8.5 | 9.0 | |
| | 38– | 86 " | 78½ " | 7½ " | 9.5 | | |
| Corn field 6 feet from | 39 | 82½ oz. | 75½ oz. | 7 oz. | 9.3 | 10.8 | 13.7 |
| tile ..... | 39– | 90½ " | 80½ " | 10 " | 12.4 | | |
| | 40 | 89 " | 76 " | 13 " | 17.1 | 16.5 | |
| | 40– | 91½ " | 79 " | 12½ " | 15.8 | | |
| Corn field 100 feet from | 41 | 87½ oz. | 80 oz. | 7½ oz. | 9.4 | 11.4 | 14.6 |
| tile drain..... | 41– | 90 " | 79½ " | 10½ " | 13.4 | | |
| | 42 | 83 " | 76 " | 7 " | 9.2 | 11.7 | |
| | 42– | 89 " | 78 " | 11 " | 14.1 | | |

## THURSDAY AFTERNOON.

Music — Cornet duet, with piano accompaniment.

### DROUTH AND TREES.

BY PROF. T. J. BURRILL, CHAMPAIGN.

Much has been written upon forests and rainfall, and much more of observation and discussion upon the relations of these is needed, but in the present paper, attention will only be given to some studies upon the drouth itself and its relations to growing vegetation.

In the first place let us ask: What is the cause, or what are the causes of drouth? Upon such a question we are very apt to seek for an answer close at hand, and to make explanations from very slender data. Thus more than once has it been suggested during the season in public prints, that drain-tile should be directly charged with the deplorable condition into which man is forcing our rich heritage of freighted air and fertile soil. The destruction of forests is wider in its reach and older in its discussion; but before we confidently settle upon any particular or specific cause of climatic change, surely the actual changes which have been known to occur in the past ought to be well studied. Tables are published in the twenty-fourth volume of the *Smithsonian Contributions to Knowledge*, showing the aqueous precipitation by months and years from 1820 to 1865, throughout the United States. These are compiled from the records of a very large number of observers under instructions, and equipped with reliable apparatus.

Taking the region from Western Pennsylvania to Eastern Missouri for illustration, and compiling the records of thirty-four observers, aggregating two hundred and forty-nine years, the average rainfall is 40.88 inches. Using this as the mean, and computing the percentages above and below, we find the amount of fluctuation is really very great. One per cent. of forty inches is four-tenths of an inch, and this means twelve thousand gallons of water per acre. What must it be for the entire area? But when we observe that the fluctuation is fifteen per cent. above the mean and a like amount below, *i. e.*, a variation from year to year of thirty per cent., we shall have to reckon by millions of tons, and then probably fail to appreciate the stupendous difference in the annual unloading of the clouds over our favored and comparatively equitable land. There are, however, other important lessons for us in the tables and figures. From 1832 to 1837 there is an almost regular decrease in the annual precipitation; then from 1837 to 1847 there is a still more regular annual increase, reaching from fifteen per cent. below, to fifteen

per cent. above the mean. Supposing some weather prophet had, in 1837 — a notably dry year — taken the records of the preceding five years as a basis of reckoning, how long would it have taken him to count up the time when the world would have been in a fit state for the final torch by which all things are to pass away? How different the conclusion, however, of the same prophet had he happened to have used the figures of the ten years preceding 1847! Here is an average gain of three per cent. each year, and thirty for the ten years.

With such examples as these, we should not be too ready to accept some petty agency of man in moving the mighty machinery of the world. I do by no means wish to belittle the power for good or evil in the human brain and hand; but do insist that we take care how we generalize upon insufficient and perhaps irrelative facts. We are not yet able to confidently assert that the changes wrought by man in America have perceptibly modified the total annual amount of aqueous precipitation, however much these changes are in many respects.

A second question as important as the first has reference to the time of the year in which the precipitation occurs. At first thought, the most of us would probably say that the heaviest rainfall came in early spring. We are certain that the water-level in the earth is highest then. If springs and tile drains ever run it is during this season. If one wants a permanent well of water, any other time than the spring is the time to dig it.

Turning again to these Smithsonian tables, and computing the monthly averages for the entire number of years, we find the monthly fluctuations extend from thirty per cent. below to forty-four per cent. above the average amount. January has the lowest record; June has the highest, and May next. In Illinois the average June precipitation from 1878 to 1887, inclusive, is 4.68 inches; that for May is 4.18 inches — the only months averaging up to four inches. The average amounts for the ten years is as follows:

| JANUARY | FEBRU'RY. | MARCH. | APRIL. | MAY. | JUNE. |
|---|---|---|---|---|---|
| 2.12 | 3.46 | 2.66 | 3.30 | 4.18 | 4.68 |
| JULY. | AUGUST. | SEPTEM. | OCTOBER. | NOVEMB'R | DECEMB'R. |
| 3.14 | 3.32 | 3.29 | 3.53 | 3.11 | .... |

What becomes of this water? Comparatively little of that precipitated in winter is evaporated, and this is why the earth be-

comes so filled with water by springtime. During the summer, however, vast amounts are returned to the atmosphere in the shape of vapor. At Rothamsted, England, the average rainfall is 28.30 inches. Of this, 43.1 per cent. is lost by drainage — tile sixty inches deep — and 56.9 per cent. by evaporation. The records made at the New York experimental station during 1883–'4–'5–'6, show an average rainfall of 25.0 inches, and a loss by drainage of 7.34 inches, by evaporation of 17.66 inches. Of the drainage loss at Rothamsted, somewhat over seventy per cent. escaped from September to February inclusive, leaving only thirty per cent. from March to August. Our summers are much warmer, and the air is drier, hence our evaporation would be still greater. The water of summer rains is largely absorbed by the earth for a time, but gradually passes back to the air as vapor. So far as our crops are concerned, this summer rainfall is of much more importance, while the precipitation of the winter fills our wells and streams.

We will endeavor now to compare the proportional amounts given off to the air as vapor from the surface of the ground, and from the foliage of plants. The average of a large number of experiments gives us about one and one-quarter ounces of water to every square foot of leaf-surface, as the amount normally thrown into the atmosphere during one clear summer day. Since a pint of water weighs sixteen ounces, it therefore requires about thirteen square feet of leaf-surface to exhale a pint during a day of clear weather. (Much less or none is transpired in cloudy weather.) Thus stated, this amount does not seem large; but when we consider the enormous aggregate measure of leaf-surface, even on one forest tree, we may gain some idea of the total quantity of water so returned to the air. A large tree is estimated to have 200,000 square feet of foliage. With a little mathematical computation, we reach the astounding result that such a tree throws into the air every sunshiny day forty barrels of forty gallons each! Ten such trees may stand upon an acre (fifty feet apart); we therefore have four hundred barrels of water as the amount daily pumped from the soil into the air by trees. Looked at in this way, the amount becomes enormous, if not incredible. It will be at once asked: Where can any such amount come from, for any continuous length of time? But this great amount would, after all, form a layer over the acre only one-twentieth of an inch thick. This again is small — less than would be evaporated from the same ground area of soil or water.

From the records given above, there falls in Illinois, from May to September inclusive (the growing season), an average of 18.61 inches of water. During this time there is reported seventy-nine days "clear," to which we may add enough of "fair" weather to make one hundred days of evaporation. Multiplying one-twentieth of an inch by this, we have five inches as a possible and probable amount transpired during a season from the foliage of plants. Some

of our figures may not be actual averages, and due allowance must be made for this; but I think we can now say that the four hundred barrels per acre each day is not an over statement. There certainly is a much greater quantity lost by evaporation from naked soil. An average of experiments gave Dr. Andre,* of Philadelphia, the ratio of six to one in favor of the soil. Mr. T. F. Hunt, of the University of Illinois, found that about one-tenth of an inch per day escaped from moist soil during clear weather. (See ad-interim report Central Illinois, page 102.) This last is twice as great as that given above for forest trees, and the comparative effects of drouth in forests and in the open ground shows that some such proportion must prevail. Where trees are set at a considerable distance apart, as in orchards, we may have, however, nearly the normal evaporation from the soil, plus that given off by the trees; for in this case the ground is not much shaded, and there is not likely to be much water-holding mulch accumulated.

Turning now to the investigations of Mr. Hunt, as given on page 102 (ad-interim report Central Illinois), we may be able to gain further lessons of much importance. The process consisted as stated, in place cited, of taking specimens of soil two feet deep and finding out the amount of water contained in them by weighing them, then evaporating in a steam chest and weighing again. The per cent. of loss was calculated upon the dry weight. The specimens were collected between the 1st and 19th of August, when the pastures were mostly brown and bare, when corn was severely suffering for water, and when many trees, especially those transplanted within two or three years, were dying from drouth, and when fires were catching from locomotive and other sparks and running wild over lots and fields. Still the water in this drouthy soil averaged 13.2 per cent. of the dry weight! When we assert that this proportion indicates for the water in the two feet of soil, an amount equal to a surface layer four inches deep, or 2,750 barrels of forty gallons each per acre, some notion of the enormous aggregate quantity can be gained. It is certainly a surprising result, and one well worth our careful attention and consideration. The amount of water in this two feet of very dry soil is equal to the average rainfall for a summer month, and, what is more significant, equal to the amount, according to the figures above, given off by rank vegetation during four-fifths of the growing season!

If these things are so, or nearly so, surely there is something else for us to think about, in connection with summer drouths, than the simple amount of rainfall. A saturated soil holds various proportions of water, according to its physical and chemical constitution. As stated in the tests by Mr. Hunt, four of the dried samples were wetted to saturation, and held, after all drainage ceased, 49.3

*American Naturalist, Vol. XVI, p. 19.

per cent. of water. Such soil (the ordinary prairie loam) may be said to hold, in spite of thorough drainage, half its weight of water, or enough to make a surface layer fifteen inches deep — three times the amount required by vegetation during the summer!

The practical question is, therefore: Can anything be done towards husbanding this supply? It has already been pointed out that naked, uncultivated soil loses by evaporation vastly more water to the hungry summer air than is exhaled by the foliage of trees and crops. In Mr. Hunt's tests, twenty eight non-selected samples from cultivated land (mostly corn) gave an average of 12 per cent., while the same number from uncultivated land (mostly stubble and pasture) gave 10.3 per cent. It is instructive to note that in the second foot in these cases, the difference in favor of the cultivated soil is even more pronounced — 15 and 12.8 respectively. That is, the cultivation of the surface causes the deeper layers — below the plow — to retain more moisture. This is easily explained, but we defer the matter for the present.

But these differences came from soil as ordinarily left in common farming. Will more thorough pulverization of the surface have proportionally better results? A remarkable case is given in the series of tests, from the orchard of Mr. Hammond, compared with specimens taken from an adjoining meadow with same soil and altitude. The specimens were taken only fifteen rods apart. The meadow had been mowed a month before; the orchard for two successive years had been seeded with rye, which was plowed under each year about the first of June. Subsequently this last season the land had been once plowed and afterward harrowed several times, keeping the surface in an exceedingly fine state of tilth. The orchard soil proved to have 24.6, while that of the meadow had 12.1 per cent. of water! This is a most remarkable and instructive result. Can we sufficiently appreciate the importance of surface tilth to make us increase our energy in the practical affairs of the orchards and fields? The proportion, 24 to 12, does not tell the whole story. We have seen that crops suffer much when there is an an average of 13 per cent. of moisture in the soil. Neither orchard trees nor ordinary field crops can take all the water from any soil. We may say that at least 10 per cent. will be thus beyond the reach of the roots' absorptive powers. Taking this amount from both samples, we have 14 and 2 as the proportional available water in the two cases.

We should not leave this most instructive matter without quoting further from the tests made in Hancock county. A potato field and a wheat stubble was compared, and yielded 8 and 9 per cent. of water — both very low! Evidently the peculiarity is in the potato patch, not in the stubble. Now this soil had not been stirred since the potatoes were dug, about the first of June. It had been deeply turned up and left rough — just in condition for thorough evaporation.

To test the effects of surface cultivation more exactly, and to eliminate all sources of error, Mr. Hunt made some artificial experiments, which must be rehearsed at this point. Two tin cans were made, twelve inches deep by six inches in transverse diameter. These had false perforated bottoms, and an opening below through which water could be supplied and then corked tight. The cans were filled from the same specimen of earth, after thorough mixing. This earth was found, upon test, to have 14.3 per cent. of water. When filled with the earth moderately pressed down, one pound of water was added to each upon the surface, and one pound placed in the bottom receptacle. Here now was moist earth having a supply of water below, but no way of escape except from the surface by evaporation. The two cans were placed side by side in the open sunshine, and each lost, during three days, eight ounces of water, behaving exactly alike in this respect. From this time on, one was daily cultivated one and a half inches deep, and the other left uncultivated. After seven more days the cultivated had lost five additional ounces, and the uncultivated one nine and a half ounces—almost twice as much! According to this, the water saved during a week of dry weather by surface cultivation of an acre, would equal one-fourth of an inch of rainfall, or thirty tons. Should not such information put renewed vigor into the work of tillage during drouth?

Orchardists should note that two feet of soil from a blue-grass pasture gave 12.3, and from adjoining land in corn, 15.2 per cent. of water. There is scarcely a doubt but that orchard trees are much better off when the general surface is cultivated in corn than when pastured or mowed. Clover, closely cut and removed, is no better than grass. Better than any crop is good and frequent tillage, an inch or two in depth.

When this title was announced, I hoped to make some similar tests upon the effect of mulch, but did not succeed in getting the work done. We know, however, that a good mulch is as efficient as tillage. When exposed soil is thoroughly dry, that under a layer of old straw is nearly saturated with water. If we estimate, as we have done above, the total amount of water thus held in moist soil, and then remember the rapidity of evaporation from naked, unstirred soil, we should not be surprised at the puerile inefficiency of artificially watering trees and plants, and the decided advantage of mulching. A coating of straw about a tree may hold more available water than would be represented by the application to the naked surface of hundreds of gallons monthly. When water is applied to the surface, enough should be put on at once to wet deep down, rather than more frequently moistening the surface. Mr. Smith, of Green Bay, Wisconsin, found by experiment that it took 30,000 gallons of water to wet down four inches. This great quantity is equalled by a rainfall of one inch. If irrigation is to be practiced,

great economy would result in supplying the water by means of tile laid just below the plow. This has been practiced in the flower-beds at the State University for some years, and found very satisfactory.

Turning now to another series of comparisons, we see from Mr. Hunt's tests, something of the effect of tile drainage upon the soil during drouth. Forty samples gave an average for tiled of 14.1, and 13.2 per cent. of water for untiled soil. But the fairest tests were in oat stubble in one case, and broom-corn field in another. The first gave 14.2 and 13.4 respectively, for the tiled and the untiled land; the second 16.4 and 14.7 per cent. in same order. In these cases there was no other perceptible difference in the plats tried than that caused by the drains. The land was the same in quality and exposure; the same in altitude and surface drainage; but there was a uniform difference in favor of the tiled soil. This was upon level prairie land. As the quality of the soil has much to do with the retention of water, it is probable that upon clayey soil, inclined to "bake," the effect of tiling would be still more pronounced in its favor. Surely there is no just cause for alarm in the use of tile to carry off the surplus and injurious water of springtime and wet seasons, on account of ill effects during drouth.

Let us now endeavor to understand the reasons underlying the foregoing results of tillage and drainage. It is quite commonly asserted that one of the advantages of tile drains is that they promote the condensation of moisture from the air during drouth. The opinion probably grew out of some one's thinking, rather than from actual experiment; for there are no facts recorded, so far as I am able to ascertain, to sustain it, while there is much to disprove it. It is in the same way supposed that thoroughly pulverized soil gains water by absorption, especially during dewy nights. Investigations carried on at the Houghton experimental farm in New York, those of Professor Sanborn in Missouri, and others, show that soil ordinarily loses water at night as well as during the day. Dew itself consists in good part of water escaped from the soil during the night, and condensed upon the colder herbage. Road-dust sometimes shows by its color that it is somewhat damp in the morning; but the water comes from the deeper parts of the earth, not from the air. It gains moisture at night simply because evaporation is not so great then as in the daytime.

The idea of dew absorption by soil ought to be recognized as hypothetical when we remember that the temperature of the earth during a summer night is always higher than that of the air above it. A warmer body cannot condense water from colder air. As a general statement we may say that soil constantly loses water and never gains it by absorption from the air during rainless weather.

Again, it is thoroughly demonstrated that plants do not absorb water from the air by their leaves. They too constantly exhale the moisture of the soil gathered by the roots. If wilted plants

revive at night it is only because the leaf evaporation is reduced below the absorptive capacity of the roots; not at all because the leaves themselves get moisture from the air.

The sole effect of tillage, so far as the water supply is concerned, is to hinder the evaporation from the surface, and in this the action is exactly that of mulch. The stirred soil is, in fact, a mulch to the unstirred part below. The drier and finer the surface layer the better its effect. We should not lose sight of the fact that the stirred soil does dry out much more thoroughly than the unstirred part. Somehow or other the same man will stir up his cut grass to make it dry faster, and then proceed to stir his soil to keep it from drying! The effect is precisely the same in both cases, but in the latter the the dry surface layer shields that beneath and partially preserves from evaporation the water in this deeper part. Pulverization destroys the capillary attraction, and so prevents the water coming in contact with the dry air. If it were possible to completely arrest this surface evaporation, we could raise any crop we grow, to perfection, so far as soil water is concerned, without a drop of summer rain. But since this cannot be done in practice, the rains of the latter half of the summer are of paramount importance.

We are slowly coming to understand that trees are, with us, summer-killed rather than winter-killed. The damage is truly done by both extremes; but it is the condition in which the trees are at the end of the growing season, much more than the degree of cold marked by the thermometers, which determines the result. A want of sufficient water in midsummer does more than simply retard growth. It induces a semi-dormant state from which the tissues awaken late in the autumn without chance for subsequent ripening, and so, poorly prepared for frost. If we would save our orchards from the vicissitudes of Winter, we must begin in the Spring, and from the foregoing, some direction and encouragement can be taken.

There are no evident natural impediments to successful horticulture in our country, which attainable knowledge and skill may not remove. One of the glories of horticultural pursuits is that they require intelligence. He who sits under his own productive vine and fig tree, by virtue of his lordly mastery over untoward influences and conditions, ranks far above him who in torpid lassitude of mind and body, has but to reach forth his nerveless hand to gather the luscious and bountiful products of prodigal nature. We need not harder toil, but further and better insight into the controlling influences and laws by which the machinery of the world is adjusted and moved, and by which we must square our preparations for conquest.

## LANDSCAPE GARDENING ON THE PRAIRIES.

BY E. R. BROWN, ELMWOOD.

*Ladies and Gentlemen:*

I do not come here as a school-master, to teach you anything about "Landscape Gardening on the Prairies." If what I do *not* know in that line is ever published, the world will not contain the books to be printed on that subject. I come, rather, as an "awful example" and warning. And yet, I am not altogether like that Wemmick in Dickens' "Great Expectations," who wore his hat on the back of his head and looked straight before him, as if nothing was worth looking at. On the contrary. A sincere love of Nature has led me to look about a little, to repent of many mistakes in regard to her, and to appreciate in some small degree the splendid possibilities of this prairie region, beyond the mere production of swine and corn. I would add my earnest word to the line upon line, and hint upon hint by which the villager and farmer may yet come to see that use and beauty should go hand in hand, on these grand plains of ours as well as elsewhere.

In a prairie country, no doubt, the amateur landscape gardener lies under some disabilities. Variety and picturesqueness are not so easily found or produced as in those regions where the face of nature is diversified by hill, dale and mountain. With the exception of Indian history and tradition, which have hardly left a mark on the landscape, we are too new. The open, unbroken prairie, stretching silently away to a distant horizon, has, indeed, something of solemnity and grandeur, and touches the imaginative soul with suggestions of unwritten history and untold cycles of time. But the moment the wide plain is broken up into farms and village sites, this sentimental element of the picture disappears. There is no sky-line of rock-ribbed and eternal hills to speak forever of the past. Old architecture, old monuments, and venerable trees, with all their rich suggestiveness, are wanting. The subtle charm of association with distant ages and departed glories lends no ideal enchantment here to scenes which we would fain endow with the harmonious union of use and beauty. Napoleon, though he had little enough of the poetic in his composition, recognized the power of these backward-reaching associations. Standing by the mighty memorials of the Pharaohs of Egypt, he addressed to his soldiers that grandest utterance of his life, "From the summit of yonder pyramids forty centuries look down upon you."

But our prairies have something the grassless plains of monumental Egypt do not possess; something that California and Florida strive for in vain — a rich green turf, the first and most essential condition of all landscape beauty. So we have little reason to covet the sepulchral glooms of the old Nile, the sunny sands of alligator land, or the granite glories of the Sierra Nevada.

A lady of Decatur, Ill., visiting in California, expressed a decided preference for Illinois as a permanent residence. "But the scenery," said a San Jose lady, "think of the scenery!" "Yes, yes, I know," rejoined the Decatur woman, "but you know one can't live on scenery."

She was partly right, but largely wrong. We do not thrive by corn alone, but partly live by sight. We may so develop and heighten the natural beauties of prairie land as to add immensely to the innocent enjoyment of life, to modify the harshness of our climate, and greatly advance the dollar value of farm and village property as well.

On the prairies we may attain the beautiful, but must mostly forego the picturesque. "The gently undulating plain, covered with emerald turf, partially encompassed by rolling outlines of forest canopy; the expanse broken here and there by groups of round-headed trees, or by single specimens whose strong trunks support heads of foliage that droop to the sod;" a sheet of water whose banks are carpeted with flowers, and whose half-hidden bosom reflects sky and clouds and trailing vines, — these are some of the things included when we speak of a beautiful landscape. Some, if not all, of the features of this picture are possible of attainment on the farms and homesteads of Illinois. The picturesque, which requires sharply broken lines and strong contrasts between the rugged and the gentle features of the scene, is far more rare than the simply beautiful; yet even the picturesque may be reached whenever we approach the bluffs of the great rivers, or even the smallest creek that by the wear and wash of ages sets the prairie rolling and pitching towards its winding bed. But the attempt to force picturesqueness on a level lawn by the construction of mounds and tin cascades and rockeries and caves, made up of brick and cement, and ornamented with conch shells, — O, it makes one weary! And like unto it is the work of the country architects, who, having built a pine house as thin as a band-box, cuts embattlements on the top of the bay window, which only need the muzzle of a fire-cracker projecting from each embrasure to become a veritable fortification.

Though a smooth green turf is the first essential condition for the homestead landscape, the selection of trees and how to place them for best effect, is a more difficult problem.

A late writer says that he cannot recollect that he ever fell in love with a bald-headed woman. However that may be, I cannot remember that I ever fell in love with a bald-headed landscape,— that is to say with a treeless one. As a fine head of hair is the physical glory of a woman, so trees are the chief ornament of Mother Earth. But the relative size of trees when full grown, their form,— whether round-head, oblong or spire-like; the color of foliage in growth and in autumn, and the space they require for full develop-

ment,—all these things must be taken into account at the start, lest even the trees become a nuisance instead of a joy forever. A weed may properly be defined as a plant out of its fitting place. The lady's hair may be a crown of beauty or a mop, according as it is well or ill managed. Nothing is more beautiful than the school-girl's free-flowing tresses, gently lifted by the breeze, or gleaming in the morning sun; but, alas, a single hair, coiled in the pudding, destroys the appetite, and mars your peace of mind. So, trees, shrubs and vines, fitly placed, are a continual delight; improperly placed, they are a waste of effort and a grief to the judicious.

Manifestly, a square, plain, solid house should have on its grounds different trees from those which harmonize with the pointed gothic cottage, and the dwelling itself should accord with the character of the ground on which it stands. Neither will it be generous or safe to ignore the taste or plans of one's neighbors. At a certain meeting of the Farmers' Club, as reported in the New York Tribune at the time of the gray-willow craze, one member sagely urged that every prairie farm should have a wind-break of gray willows, or other quick-growing trees, on the north and west lines, leaving the east and south sides open to sun and air. There was nothing said in the report to indicate that any one noticed the absurdity of the idea, but in the course of a week or two it was discovered that one man's north line was his neighbor's south line, and that such a wind-break would completely inclose every farm. The moral of this is, that we cannot, if we would, arrange our own grounds regardless of the interests and idiosyncracies of our neighbors.

> "God never made an independent man,
> 'T would jar the concord of His general plan."

Rows, geometrical figures and stiff military lines of long-legged trees should be avoided. In the city such lines are a necessity; but why should country villages destroy their chief charm of picturesqueness by trying to be a city in miniature? Out in Pueblo, Colò, four years ago, a mighty cottonwood, twenty-seven feet in circumference, the one lone tree of the town, had just been cut down in the main street. I asked a citizen what possible excuse there could be for such vandalism. "It stood right in front of a grocery, and was in the way," was the reply, "and so the town council ordered it removed." This same sapient council had set out on the street rows of little cottonwood staddles, some two inches in diameter, mere toothpicks compared to the giant they had cut down. The wisdom and the gold of Solomon could not replace that landmark in less than a century of time.

Trees, as a rule, should stand, not in files, equi-distant from each other, but singly or in groups of two or more. There are two valleys in this country, lying three thousand miles apart, both famous for beauty of landscape—that of Santa Clara, California, and the valley

in which lie Northampton, Hadley and the Deerfields, in Massachusetts. In the former, as viewed from the foot-hills of the mountains on either hand, the wide-spreading, broad-headed evergreen oaks, scattered like sentinels sparsely over the entire valley, are a delight to the eye; while on the Northampton and Deerfield meadows, the magnificent old elms, standing solitary or in pairs and threes, are the glory of the landscape. Jenny Lind thought the latter (the Northampton meadows) one of the finest sights on earth. In the little village of Deerfield the great elms lock arms across a street one hundred feet in width, and voices under that noble arch echo as in a vast empty hall. How light a task it was to set those trees at the first, and how easily to judge, from the chance trees in the meadows, what kind to set and what space to give them! Think what an easy task it would have been, for instance, forty years ago, to plant an avenue of white elm trees from Princeton to Tiskilwa, with spaces of 75 feet in the rows, and the same across the road. It would have been splendid by this time, and in another forty years it would be worth a journey across the continent to ride through that glorious gallery on a June morning! Such an avenue would seem to lead to the land of Beulah, or the Delectable Mountains. Now, here is the chief point I wish to make at this time, viz.: that a level tract and a hilly or uneven tract require different treatment and a different selection of shrubs and trees. I make an exception in the case of the American elm, the king of trees, which, if it can have space, justifies itself everywhere. In maturity it combines in itself grandeur, grace, strength and beauty beyond any tree that grows. It will stand with its feet in the water all the year round, and never get catarrh or rheumatism. What locality is there in town or country that this noble tree would not adorn? To be sure, it takes time. He who plants an elm will hardly live to see its maturity. But why not, in this line as well as in others, do something for posterity? The boy plants a watermelon seed, and in half an hour digs it up to see if it has sprouted; but we are, or should be, "children of a larger growth" than that.

Everything above the turf — the buildings, shrubs, vines, trees— should be so placed as to bring out, to exaggerate, so to speak, the natural features of the landscape. It is especially desirable in our own region of tame and monotonous scenery, that we make the most of such variety of surface, such hills and dales as we have. Nature gives us a hint. On the summit of the Sierra Nevada Mountains, the spire-like redwoods and sugar pines shoot up two hundred and three hundred feet toward the blue, suggesting indefinite and infinite height. The black spruce, with its pointed top, crowns old Greylock in famous Berkshire, while in the valley below grow clumps of alders, tufts of willows, fat, round-headed sugar maples, and the sycamore, spreading all abroad by the river bank. An ancient poet saw all this, as poets are apt to do:

"High on a hill a goodly cedar grows,
Of wondrous length and straight proportion,
That far abroad her daintie odor throws."

Lowell, too, has seen it, for he says :

"On yon bare knoll the pointed cedar stands."

Low grounds, near sloughs or streams, after first allowing ample space of turf, should be planted in vines and shrubs, and trees of low-growing habit. The alder should be there, with its large corymbs of white flowers ; and the common alder for wild grape vines and clematis to run upon. These will furnish for an unsightly slough, or the banks of a creek, a band of embroidery of which Mother Nature herself need not be ashamed.

Trees of a tall, oblong or spire-like head, should stand on declivities, or crown the high points of the landscape. Let us suppose that there is on the homestead grounds, at the rear, a gentle roll or rise of five or ten feet, which we wish to enhance and make the most of. Leaving the first part of the declivity as open lawn, set a line of low shrubs ; next behind these place low-headed trees— the red bud, or the classic and beautiful hawthorne ; then sugar maple and box alder or trees of similar form; and bring up the rear with tall and pointed trees; or, beginning with gooseberry bushes, follow back of them in order of height with plum, apple, butternut and so on to the tallest to be had. The trees will apparently be growing on a ridge twice or three times its actual elevation. This is a kind of deception that even old Isaac Watts might excuse. On level tracts, trees of medium height, honey locust, ash, sugar maple, and, of course, the elm, are appropriate. The principle of which I am speaking is sometimes recognized, but oftener ignored, in the erection of buildings. A broad, square, low house on the summit of a knoll, is incongruous, and painful to the view ; and a tall, pointed and turreted structure on a level stretch of prairie, is equally an abomination.

In a properly executed landscape painting, the lines in the foreground are free and bold, diminishing and softening toward the background, giving the effect of distance and depth. The lawn should be arranged on the same principle. There should be no bushes, knickknacks or shrubs at the front ; simply a few goodly trees on a smooth turf, with wide, hospitable spaces between, to "let the light in and the sight out." Toward the rear the shade may be more dense, nearly hiding the ground, giving, if possible, suggestive glimpses of the silver surface of pond or stream ; but, at least, leaving, here and there, narrow peeps through to some vague and indefinite beyond. So we may help out the fancy, and an acre or two shall seem to stretch away to a wide estate.

Do not try to have every fine thing that grows. As our rooms should not be wildernesses of gewgaws and bric-a-brac, so the lawn

should not be a jungle of variety. You and I know many such rooms, in which, besides the fitting furniture and pictures, and artistic decorations, there is a wild hodge-podge of plaques, decalcomanie, diaphania, paper flowers, dried flowers, phantom-leaf work, moss work, spatter work, Easter crosses, soap advertisements, wax flowers, monograms, barrel chairs, cone work, hanging shelves and lambrequins, watch pockets, broom holders, slipper pockets, match holders, cat-tail easels, and "God Bless Our Home!" The lawn is often another equally sad and meaningless jumble of things, pretty in themselves, but made a nuisance by their multiplicity and aimless setting.

Now a word as to flowers and color. In some retired and partially shaded nook, let the early spring bloomers have a chance. Especially let us have our old acquaintances, the dandelion, the spring beauty, and the Dutchman's breeches, followed, a little later, by the lady's slipper and buttercups. In midsummer and later, give our native asters, thistles, and glorious golden rod a fence corner in which to bourgeon at their own sweet will. Then, to crown the year with glory, the trees should be selected with a view to the grand autumn object lesson in tints and shading, which they are to furnish to the open eyes of the children of men. Then we shall welcome, at the autumn disrobing of Nature, the lemon tint of the elm, the bloody hue of the Virginia creeper, the claret of the small oaks, and the ruby of the sumach, while the sugar maples glow with the whole chromatic scale of reds and yellows. Even the blue of raspberry stems and the coffee color of blackberry patches add to the infinite range of tint and shade that signalize and delightfully prolong Nature's annual disrobement. The trees and vines may be so selected as to keep up the glow and glory of autumn color for two months' time.

Ours is a rich and beautiful commonwealth, in the grandest country on all this interesting and funny and solemn old globe. In the dreamland of fancy I see her rise, as she bids fair to do, to the position of chief and empire state; and I fervently hope this Society may do something towards covering her fair prairies with beauty, and nothing whatever to blot them with deformity.

## REPORT OF COMMITTEE ON STRAWBERRIES. HANDLING AND MARKETING.

BY H. K. VICKROY, NORMAL.

In handling and marketing fruits, it is necessary to have on hand a good supply, made up, of small crates, holding from four to six quarts, for pickers to carry their berries in; quart boxes and crates for marketing the same. If this important matter is neglected, it will cause delay and much inconvenience afterwards. Wire-made boxes will give the best satisfaction. They never come apart

or bottoms fall down in handling, which is a serious objection to those made with tacks. If parties having only a few berries can't afford a machine, they had better buy them from those who make them. Boxes and crates should be new, clean, and neat in appearance. Having everything ready for gathering the fruit, each picker fills his or her crate with empty boxes and goes to the field, where they will be given a row by the man who has charge of them in the field. The business of this man is to show them how to pick the berries with from one-half to one inch of stem, taking hold of the stem with the thumb and finger and pinching it off, and laying the berries into the boxes; to see that all the ripe berries are picked, and none taken too green; to keep them on the rows assigned them.

The assorting of the berries into two classes should be done in the field as they are picked, to save handling, for the less a strawberry is handled the better. Some pickers will quickly learn to do this assorting, while others you can not teach.

We are obliged to have the berries looked over after they are brought to the berry-house, unless we know who picked them. After the berries are looked over, they are put into crates and set in a cool place until they are sent to market.

The practice of many, in putting the largest and finest looking berries on top should be discouraged. The top should show a fair sample of the contents of the box.

Berries intended for distant markets should be picked a little green; those for home market ripe.

Each picker is provided with a printed card, as follows:

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mon.... | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 1 | 1 | Total. |
| Tues... | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 1 | 1 | |
| Wed.... | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 1 | 1 | |

NOT TRANSFERABLE.

*Name*.....

*The person accepting this Card agrees to pick all Berries in a good, merchantable condition. Strawberries with from one-half to one inch of stem.*

*To those who pick every day through the season and are not tardy without a good excuse, I will pay ..... cents per quart, and otherwise ..... cents per quart, to be paid at the end of the season.*

H. K. VICKROY.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Thur... | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 1 | 1 | Total. |
| Fri..... | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 1 | 1 | |
| Sat..... | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 1 | 1 | |

The picker keeps the card, and the person who receives the berries the punch. When they bring in the berries the number of quarts is punched out. This is all the account we keep with our pickers.

We have tried a number of ways of keeping accounts with our pickers, and this one has proved the most satisfactory to both parties. Nearly all the growers in our vicinity have adopted this plan.

We have it distinctly understood, and it is on the card, that those who come every day, unless they have a good excuse for being absent, and pick through the season, will receive one-half cent more per quart, than those who come irregularly.

Marketing fruits at a profit, requires preparation beforehand in making arrangement with home dealers, selecting points to ship to when home market is over-stocked, and getting special express rates.

Where there is a good home market, local growers should sell at a uniform price — letting supply and demand govern this price. They should keep well posted as to the quantity of fruit in their neighborhood, and work in harmony to maintain fair prices for their fruit.

Where fruit is shipped, I think it would be better for one person to have charge of all the fruit shipped. The fruit would be more evenly distributed, and no market glutted. He could make arrangements with parties to supply them with berries every day when the prices would justify. Both consignor and consignee should keep each other informed as to the supply and demand.

There is always a time when there is an over-supply for a few days. This should be provided for by having orders from parties for canning. If all these little things are attended to at the proper time it will add much to the profit of fruit growing.

## REPORT OF COMMITTEE ON STRAWBERRIES—VARIETIES.

BY WM. JACKSON, GODFREY.

*Mr. President, Ladies and Gentlemen:*

In making the following report I shall try as far as possible to confine myself to a description of the "kinds of strawberries" grown on my own place, and under my personal observation, recommending such only as have with me an established reputation for home and market purposes. And though this report may to a certain extent seem egotistical, the reasons for this will be sufficiently explained hereafter.

Probably the more prominent reasons for my making the above statements are, that condition of soil and aspect are widely different in different locations for successfully growing strawberries. The above conditions, together with the disposition of the individual mostly interested in the growing of this fruit, have much to do with success or failure. As an illustration of the above facts, I will state that at one of the meetings of the Alton Horticultural Society, held at my house some years ago, Captain Hollister exhibited some Wilsons larger, I think, than any Sharpless that I ever saw. Perfect in

shape, and rich in color, none of the members present were able to name them, and when Mr. Hollister stated that they were Wilsons, every member was surprised, but accepted his statement as correct. But they received especial care and cultivation.

The above illustration might be sufficient in itself to prove just what might be done with a kind of strawberry that has been discarded (unnecessarily, I think sometimes,) here for years, by care and high culture.

As a further illustration, however, and possibly a more striking one, I will state that Mr. James Davis, my next neighbor, has made a specialty of the Downing for many years, while after two years' trial I was compelled to discard it as unsuitable for my purpose. To stop criticism, I will admit at once that in this instance it might be that the individual was to blame, but if so, I should be at a loss to account for the fact that Mr. Riehl has for some years, and is probably at the present time, making the Captain Jack his principal berry, while in the neighborhood in which I live no person would ever attempt to plant the above kind for general purposes. In taking the above facts into consideration I think it would be unwise, at least, for any person to say that this or that kind is the best, only so far as his personal observation extends.

Of the newer kinds of strawberries, of which I have some twenty kinds, I do not feel disposed to say anything at present. I would have liked very much to have been able to say something about the Bubach, especially as it is indigenous to this State; but I was unable to procure plants in time to test them for this report without paying an exorbitant price for them. I am very much indebted to Mr. H. K. Vickroy, of Normal, and to Mr. Matthew Crawford, of Cuyahoga Falls, Ohio, for their kindness in furnishing me with plants of the newer kinds for experimental purposes, and of which I may, if necessary, be able to report at some future time through the reports of the Alton Southern Horticultural Society. From personal experience I can recommend the first three kinds in the following list of strawberries as amply sufficient, with any reasonable amount of care, for either home or market purposes.

*Miner*—This is the best general-purpose berry I have, and has been my principal one for nearly eight years.

*Champion*—A first-class berry with me. Its deep rich color and perfect shape are strong recommendations in its favor.

*Jersey Queen*—I have had this kind in fruiting four years. With careful cultivation and good rich ground it is a splendid berry. Its good looks and fine flavor will always find a ready market. Those three kinds ripen about in the order named, and were it necessary for me to be restricted to three kinds, the above would be the kinds I should choose for profit. As a matter of course I have to keep other kinds to supply my plant trade.

*Sharpless*—Or Shapeless would have probably been the more suitable name for it—has its large size and healthy foliage to recommend it; but its natural deformity frequently prevents it from ripening up properly, and with me it will soon be replaced by the

*Ontario*—I fruited this kind to a certain extent last season and like it very much. The plant is like the Sharpless, but the fruit is much better in appearance and uniform in shape. I shall plant it extensively.

*Mt. Vernon*—A fine berry, and very prolific; but the ease with which the calyx separates from the fruit, makes it rather undesirable for market purposes.

*Sucker State*—This is a fair berry, but turns somewhat soft in warm, damp weather.

*Golden Defiance*—I got this kind from E. P. Roe eight years ago, and have planted it regularly every year up to the present time. It is a beautiful berry, but requires very careful handling. If the season is unfavorable it is apt to turn soft.

*Kentucky*—This kind is very late. I have several times intended to discard it, but have never been able to find any other to just fill its place. I planted more largely of it last spring. If picked early and marketed at once, though rather unattractive in appearance, its eating qualities are very good.

*Crescent*—So often described as to be unnecessary to say anything further here, except that I do not need it.

*Manchester*—I had almost come to the conclusion to discard this kind, but happening to have a few plants of it in low, moist ground, that did very well, I concluded to try it a little longer. Its great fault is its tendeney to rust.

The above kinds I consider good as far as stated, and they are about the only kinds upon which I place my dependance for market purposes at present.

In conclusion I will state that in the past I have tried the Bidwell, Big Bob, Crystal City, Downing, Duchess, Forest Rose, Glendale, Capt. Jack, Jucunda, Monarch, Nianan, Piper, Sterling, Vick, Wilson, and many others whose names I fail to remember at present. Many of them, after paying a big price for plants, I discarded as worthless, while others were superceded by better kinds. I am still looking for my ideal strawberry.

## AD-INTERIM REPORT FOR SOUTHERN ILLINOIS.

BY J. S. BROWNE, ALTON.

*Mr. President:*—Leaving Alton on the morning of November 19, I arrived at Centralia the same evening, where I found berry-growers generally feeling very despondent. The past season's berry crop has been almost a failure; on all new beds it was destroyed by the insect that I believe they call thrips. The old patches, which al-

ways bloom a little earlier than the new, were caught by a late frost while in blossom, and over one-half killed. Still, I think they made as much clear money from the few they did have as they did last year, when they marketed the largest crop in the history of berry growing at this point. Patches that had been neglected the most yielded the best; in fact, a true lazy man's year. To this I think there was but a single exception, and this grower ascribed his full crop to an intervention of Divine Providence in his behalf, to reward him for abstaining from work on Sundays.

In many instances where Miner was relied upon to fertilize the Crescent, it in a measure failed, owing to blooming too soon, while Wilson and Capt. Jack did better. Crescent is the principal variety grown, though discriminated against and quoted at a lower price in the market than any other variety. Its strong point is a great quantity of berries under almost every adverse circumstance. Like everything else, it seeks its level and returns a very small quantity of money. That the berry-growers in the neighborhood of Centralia, and the whole of Southern Illinois as well, since the Crescent has been so generally grown, have made nothing, I think no one will deny, and though some of the newer varieties may take its place, among which Warfield's No. 2 is very highly spoken of by those who have tested it, it will be some years before this event takes place, so that the outlook for berry-growing in the near future, as a profitable business, is not very brilliant.

The outlook for the berry crop of '88 is very poor,—I should say not over fifty per cent. as compared with the crop of '86. While some few patches of last spring's planting have a fairly good stand of plants a majority do not show as many plants as when through planting. Old beds have made no new plants, and will not produce more than one-half or two-thirds of what they should. When the strawberry plant has to struggle so hard for a bare existence, as it has had to do during the past season, it cannot prepare itself for a large yield; so that no matter how favorable the spring may be, there is bound to be a short crop. This summary will apply to the whole of Southern Illinois, from Centralia south.

Some strawberry growers in this vicinity, having worked their farms up to their fullest capacity in berries, are now beginning to reap the results of their folly. When a patch became too old to be profitable it was plowed up and immediately replanted, without another crop intervening. Some Alton growers whose names I will not mention, could have told them that this system of cultivation does not pay; they know all about it for they have been there before.

Mr. B. Pullen reports his spring planting, which was planted on land that had been in meadow, almost destroyed by cut-worms—having found as many as thirty-seven at a single plant.

The planting of strawberries in the spring of '88 will be very heavy; the only thing to prevent it being the largest on record will

be the scarcity of plants. Growers generally are not discouraged by failure and low prices, for where there is one who has had enough and is going to quit, two will be found willing to venture.

The cost of laying down a twenty-four-quart crate of berries in Chicago, from here is: Picking, 48 cents; crate, 16 cents; freight, 18 cents. Total, 82 cents.

Young Ben Davis apple trees have borne a good crop and sold well; Jonathan lightly; Minkler has proved to be as good a bearer as Ben Davis, and of much better quality; other varieties have generally failed. Spraying with London Purple has been tried on apples by Mr. Pullen, with highly satisfactory results, though applied two weeks too late. He used one pound to eighty gallons of water, with about a tablespoonful of Paris Green added. This mixture proved altogether too strong, as it burnt the foliage; will use it much weaker next year. The sprayed trees were near the house, where the codling moth held full possession; no perfect fruit had been gathered for several years; this year the crop of perfect fruit was fair, in fact, the only good apples gathered were here; all the balance of the crop from his large orchard went for cider apples.

Dr. —— Biddel, of this place, has two seedling grapes, described by those who have seen and tasted the fruit, to be very fine; they have shown no tendency to disease. The first is a white grape; bunch large and very compact, berry very large and sweet and of best quality; ripens about two weeks after Concord; the second has a medium-sized bunch, color black, skin thin, but does not crack; is an extra good keeper, a strong grower, inclined to overbear, ripens with Concord.

Leaving Centralia the evening of the 21st, my next stop was at Cobden. This point is one of the most important fruit-growing districts in the State. The growers here do not confine themselves to one branch of the business, as the following statistics, compiled by Mr. T. E. Goodrich, will show, though tomatoes seem to be their specialty: 10,000 cases spinach; 200 cases persimmons; 29,000 cases strawberries; 9,000 bbls. sweet potatoes; 6,500 bbls. apples; 16,000 boxes pie plant; 17,000 bu. boxes melons; 276,000 ⅓-bu. boxes tomatoes; 31,000 ⅓-bu. boxes peaches; 10,000 ⅓-bu. boxes apples and pears; a total of 510 cars. This is for the year ending October 22nd, 1887.

The past season has been very encouraging to growers here. The apple crop was fairly good — about two-thirds of an average — and sold at good prices. Pears yielded well. Tomatoes fine, with prices above the average. Peaches have borne for the first time in several years, and prices have been very satisfactory. Sweet potatoes about one-half, but the increased acreage will bring the out-put up to about two-thirds of an average. Strawberries very poor. Melons, good; demand was brisk with prices according. Cherries heavy; quality superior; no worms.

The large and profitable peach crop of the past season, from Makanda south, will make the planting of new orchards very large throughout the whole of Southern Illinois; hundreds of thousands of trees will be planted the coming spring — probably no other single variety will be as largely used as the Ede; it has proved highly satisfactory in every respect; comes just after E. Crawford; yellow fleshed; large size, and has a handsome red cheek.

The tomato is evidently pushing the strawberry into the background as a main crop in this locality, the out-put is increasing yearly; it is grown tied up to stakes almost exclusively; Acme is the favorite variety, though some have tried the Mikado, and are pleased with it.

The method usually followed here of propping peach trees, is to plant a substantial pole, somewhat longer than the tree is high, close to the body, and then, by means of tarred strings tied from the top of the pole to limbs that are opposite to each other, make one limb support the other.

The great drawback to this locality for vegetable growing is the cost of manure. Ninety-five car-loads have been received here from the Chicago stock yards in the last two weeks; it costs about twenty dollars per car, or about one dollar and twenty-five cents per two-horse wagon loads, if the car is well filled, and many of them are not. When to this is added the cost of hauling over rough roads, from the cars to the farm, it becomes very expensive.

Pear blight seems to have been very destructive here in the last few years, whole orchards having been destroyed, but growers still continue planting, though in a small way — no more eighty acre orchards.

My next stop was at Anna. The apple and pear crop has been good; peaches very good. Mr. Jacob Miller is one of the few who had faith enough in peaches to continue planting; now he has large orchards of young trees in fine condition, and this year commenced to reap the reward of his persistence. He thinks so well of the Ede that he will plant one thousand trees next spring — he speaks well of the Marlborough raspberry. Mr. J. B. Miller has interested himself for several years in growing seedling varieties of fruit. From the large number he has I will notice a few: A grape, bunch and berry similar to Perkins; amber in color and sweet as honey; it makes a fairly good raisin, as I can testify. A strawberry that is from seed of the Green Prolific; has a fine leaf, strong grower, large size, bright scarlet in color, perfect blossom, firm, and promises to be a good shipper. A peach from Troths,' large size; high color and very hardy; bears when any of the seedlings bear. An apple, seedling from the Winesap; similar to it in shape; of a brighter color; it bore for the first time this year; he thinks it will be a better keeper and an improvement on its parent.

From Anna I went to Villa Ridge. This place has been especially favored in having good crops of everything, with the exception of strawberries. Peaches were not winter-killed at all, but nearly all of the earlier yellow varieties were caught by a late frost while in blossom; the quality of the crop was excellent, with a correspondingly handsome balance in favor of the growers. Apples did well, all the early varieties, and especially Red June, which sold at from four to five dollars per barrel, brought good prices. Strawberries here, as elsewhere, very poor. Grapes have had a most favorable season. In the experimental vineyards of Geo. W. Endicott and E. J. Ayers, where something over an hundred varieties are grown, none rotted. Mr. Endicott has fruited the Empire State, and thinks well of it; Perkins is a good wine grape; it rots very little, and has the additional quality of making a good wine. His favorite peaches are Thurber, Silver Medal, Mountain Rose, Ede, and a new yellow-fleshed one, called Elberta; it comes from Georgia, is as large as E. Crawford, very high-colored, and ripens just before Old Mixon. Of plums, he thinks the Golden Beauty will be valuable to plant among peaches, to catch curculios from; it is very hardy, and sure to bear; counted as many as twenty-six crescent marks of the curculio, but found no worm; Spaulding is of as good quality as Green Gage; curculios do not damage it; Botan is an early bearer, as large as an Amsden peach, and of good quality; Robison is a good bearer; Mariana has a poor color, but does not sprout; he thinks it will make a good stock to graft onto. All the varieties of seedling apples exhibited by Mr. W. R. Crain for the past two years, at our meeting, have borne good crops; their names and descriptions can be found on page 65, Vol. 19, Reports of this Society. These apples deserve to be more widely planted, as they are well worthy of trial. Mr. E. J. Ayers considers the Cottage a very valuable market grape; it has an extra good leaf, a tough skin, and is a good shipper; does not rot; ripens about a week before Concord; he is much pleased with Moore's Early, since he has grown it in vineyard. Strawberry growers here are getting tired of planting the Crescent, and are going back to the Downing, as it has proved the more profitable of the two.

The fruit show at the September meeting of the Grange was exceptionally fine, both as to variety and quality, for a selection taken to the State Fair, at Olney, took the first premium for the best display by a Society.

## REPORT ON STONE FRUITS.

BY D. B. WIER, LACON.

We of the northern part of the state have but one fruit of the almond family left — the native plums. All others belonging to that family have failed.

Cherries of the Kentish and Morello families have gradually died from the effects of cold and foliage diseases, and all the fruit except the very earliest varieties has been rendered worthless by the young of the plum curculio.

Our cherry trees could withstand the severe cold, but could not withstand both the cold and a peculiar fungus disease of the foliage, which made its advent into my neighborhood about fifteen years ago. This disease spread from the south here, and became in time so virulent as to destroy not only aged trees, but also stocks and seedlings, and was so destructive that for eight years I could grow no cherry trees at all in the nursery. Of the sweet cherries, Early Purple, Guigne and Gov. Wood are nearly exempt from this leaf blight. This is the *only* reason, I think, why these varieties are hardier than other sweet cherries. The sweet cherries seem to be more liable to the attacks of this fungus, but when introduced, soon becomes virulent. All, even the Mahaleb, in favorable seasons for its development, were completely destroyed.

I conclude, from careful observation, that this fungus often finds its *nidus,* breeding place or starting point in the wounds made in the leaves by leaf-lice, plant-bugs and other insects that feed on the foliage. It is not the result of weakness of the tree, caused by severe cold, for when it became epidemic it killed seedlings of the first year.

It is a well known law in vegetable physiology, that any cause that injures the foliage weakens the whole system of the tree. If the functions of the foliage are entirely destroyed for a time in midsummer every part of the tree loses its vitality. Just so far as the foliage is weakened in midsummer or a little after, just so far are the roots weakened. Weakened roots lead to a weak and delicate growth the following season, with great liability to disease. In such cases, if severe cold intervenes, the tree is dead.

I wish here to emphasize this point, that to have hardy healthful trees, they must have healthy foliage throughout the season. I have had good proof in my personal experience that it is a fact that in many cases one fruit tree is only hardier than another in so far as its foliage remains entirely healthy during the season of growth. As an example that this is partially true, at least, I would refer to a large nursery of three-year-old apple trees, on my place, that was well-nigh entirely kept defoliated during the summer of 1873, and until late in autumn, by the Lesser Apple-Leaf Folder *(Le Barron).* The winter following was a severe one, and the spring following they were all found, as we say, winter-killed. The Duchess of Oldenburg, Red Astrachan, Fameuse, etc., as badly as any others. I believe the Duchess was in the worst condition of any. Now it so happened that there was a small portion of this nursery on very deep, rich, moist soil, where the foliage was not acceptable to the taste of this caterpillar, and they escaped defoliation. Some of what

we call the most tender varieties ran into and through this piece of soil, such as Early Harvest, Wagener, etc., and they passed the winter with very little injury; beyond the limit of this piece of ground, where they were kept defoliated, they were all ruined.

We will now again take up our stone fruits. Our cherry trees were killed by leaf blight and cold, combined. Our European plums were rendered useless by the plum curculio, rotting of the fruit, and cold. The apricot and nectarine have had their fruit entirely destroyed since the advent of the plum curculio. Severe cold, the introduction of blue grass, the plum curculio, and the gradual introduction of foliage diseases, combined with the peach-tree borer, has obliterated the peach as a cultivated fruit in Northern Illinois, leaving us no stone fruit of any value save the native plums. Are these of any value? I am constrained to believe that at least nine-tenths of those who have attemped to fruit them would answer quickly and emphatically, NO! Nearly all who have planted and cared for them have completely failed to get any fruit, while a few of us who have studied out their necessities, or stumbled on them accidentally, have found them among the most reliable, useful and profitable of fruits, through a long series of years, and these years the very worst in point of weather this state has ever known.

Why do we find this contradiction in opinion as to the value of these plums? It is simply because of one point in their nature that has not been understood, namely: But very few of them are fertile with their own pollen. They must have acceptable pollen from another variety or species, to render their flowers fertile. For instance, the variety known as Wild Goose, has been growing on my place for years, as individual isolated trees, and in groups all of that variety. So has the variety known as Miner. In all such cases neither of them has in that time matured a fruit. I have, also, seen many instances where these two varieties are growing quite near each other. In all such cases both varieties have been yearly productive of fine, marketable fruit. The same facts have proven true of many other varieties growing here. A few varieties are fully fertile with their own pollen.

So far as tested, the variety known as Miner fertilizes the flowers of all others, and all others those of the Miner; therefore, so far north as the Miner is hardy, the question of how to fruit the native plums in abundance is very easily answered. How? By planting them in rows four to six feet apart, with every third tree a Miner, with the rows twelve to twenty feet apart. Anyone having good, healthy trees of these plums that refuse to produce fruit, can quickly make them productive by grafting the Miner into their uppermost branches. The Miner, when isolated, is rendered enormously productive by grafting into it Wild Goose, Newman, and perhaps other varieties of the Chickasaw group. The plum curculio has no more to do with the native plum crop than it has with the corn or potato crop. The

young plums fall from the trees before maturing, simply because the ovaries, the seed germs, have not been fertilized (or pollenized, which I think is the better word). It is probably true that the plum curculio laid one or more eggs in every one of them, but nevertheless the fruit would have matured into good, marketable plums, if the stigmas had received and sent down to the ovaries acceptable, potent pollen. I can say, and tell the truth, that I have marketed a Miner plum that had on it eighteen ovipositing marks of the plum curculio, all of which eggs had failed to hatch.

The season of 1883, when the great mass of plums came into bearing on my place, I think this insect was as plentiful as it was possible for it to be anywhere. (For I had a great amount of late cherries in which they seem to hatch and mature freely). That season I failed to notice a single plum that did not show the well know star and crescent mark of this insect, and as high as twenty-three of her marks on one fruit. Yet the trees matured a full crop of fruit, that sold freely in the market; there were no worms in them. I had four full crops of plums in succession, ending this past season with about one-thirtieth of a full crop—all of these crops showing a continual decrease of the Plum Curculio, ending with the past season, when I calculate that I only had two per cent. of the original number left on the place, or a decrease of ninety-eight per cent.

This leads us up to some of the grandest, most glorious facts in modern horticulture. They are, that we can have the native plums in abundance everywhere; and another is, that if we plant and fruit these plums abundantly everywhere, that, in itself will protect all our other fruits from its ravages. Or, in other words, it will no longer be known as the most injurious insect of our orchards. Why? If I have told the truth I have shown that this insect can breed only to a very limited extent in most of these plums; and as it seems to prefer these plums as its natural food plant, and seeks it above all other trees in early spring to feed thereon, and being there, finds acceptable fruit in plenty in which to lay her eggs, and but few of the eggs so laid hatch, and still fewer of her young that do hatch can feed to maturity on these plums, the result must be that the insect is well nigh exterminated in this mistaken endeavor to reproduce her kind?

The wild plum was, and is yet, the natural, and nearly the only, most certainly the preferred, food plant *and breeding plant* of the plum curculio. What is the explanation, then? It is this. A life, when existing in its natural conditions, and is being preyed upon by another life in some vital point liable to cause its extinction, defends itself against the aggressor by continuously, through many generations, gradually strengthening the weak or threatened point. Or, in other words, the continuous survival of the fittest. By this means we know, or, at least, I know, that the fruit of the wild plum has

become so changed that the plum curculio can no longer breed in them, or, at least only to a very limited extent.

In my studies of this subject I have found but one material point that we should guard against; it is this: In a few of the Native plums—a very few—the plum curculio breeds quite freely. These, no odds how useful their fruits, should not be planted, or if now planted, should be destroyed or grafted to other varieties. A few other varieties will be found of which the fruit mostly rots, the rot spreading from the punctures of this and other insects.

One other point and I have done; and it is a very valuable one. It is this: Insects must *eat* to *live*. They are, all of them, voracious feeders at some point in their lives, either as young or adults. This gives us a chance at them. As Dr. Riley has observed, the wild plums were the original natural food plant of the plum curculio. She leaves her winter quarters the first warm days in spring, very hungry. She at once seeks the wild plums above all other plants on which to feed. Now, if we take advantage of this fact, and thoroughly spray our plum trees with the arsenical poisons, just as their buds are swelling, is it not probable that we will poison every one of them? And even that will not be all the advantage gained by such spraying. By it we will destroy nearly every other insect injurious to the foliage of the plum and our other fruit trees.

By this means we will get the healthy foliage so necessary for hardy, healthy, fruitful, long-lived trees.

It is true that many of these insects that are very injurious to foliage do not eat solids, but suck the juices by puncturing, therefore would not take the poisons internally, but it is a fact that these poisons are escharotic in character, or poison and kill their delicate organisms simply by contact, and we do not know but what these poisons will also destroy or prevent the development of fungi. It is reasonable to suppose that they will, many of them.

Our worthy Secretary did a little spraying to his apple trees last spring, and was most agreeably surprised this fall by gathering a fine crop of apples from the trees so sprayed, and none from any others. And I have no doubt but that if he had looked them over carefully during summer he would have found them with much healthier foliage than the trees not sprayed, and best in every way.

There are hundreds of species of insects preying on the foliage of our fruit trees just in the nick of time, exactly when they need all their force unimpaired, just when the young fruit is setting and needs perfect nourishing, that spraying with proper poisons will destroy. Therefore, I say that in the native plums, arsenic, Paris Green, London Purple and Buhack, we have the means for the regeneration of our orchards if we will only use them.

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## EVENING SESSION.

Music.

### REPORT OF COMMITTEE ON FLORICULTURE.

BY MISS ALICE STEWART, HAMILTON.

At first only such plants as were used for food were cultivated. Later, those found to have medicinal qualities were given attention. No thought of care was given to the Flora of that earliest of gardens where all things useful and beautiful were gathered.

The garden whose designer was supreme, and in which was first centered home and happiness, is later given a greater — the *greatest* interest to mankind as being the scene of the agonizing and crucifixion of our Saviour. Surely it is hallowed ground.

A garden: Where is the mind so narrow that can see in this word — old as the creation itself — only the fruits and vegetables, the value for the table, the profit and loss, while there clusters around every plant so many tender associations?

What blossoms are oldest, and who first cultivated them, we may never know.

Nature, with her customary prodigality, scattered them all over this big, round world, and the seeds are now in the hands of such industrious planters as the wind, birds, river and ocean currents.

There is one kind of flowers to which but little attention has been given for their floral value, and which is cultivated by our good friend the horticulturist. They are the blossoms of our fruit-bearing trees. A cherry or plum tree, with its milk-white flowers, or an apple, with its countless petals of white and pink, is "a thing of beauty," and furnishes a hope which is sometimes crushed. But even then, do not consider your work in vain, the flower-crowned tree is not a cumberer of the ground.

Besides, if the horticulturist would follow the process, as reported by M. Beer as having been successfully tried in the Botanic Garden of Vienna, his hope might have more to build upon. He says, "The process consists in touching the stigma of the flower, just before it blooms, with a pencil dipped in honey, or, better still, honey mingled with the pollen of the plant being operated on. The process has succeeded admirably, it is stated, on fruit trees, and even on certain particular branches of trees, which had never borne. On portions thus treated, fruit formed in regular course, while other parts remained in their normal condition."

Darwin tells us that man originally sprung from the ape. This theory, whether true or false, is a good one, for it shows us that cultivation brings things nearer perfection.

Flowers, the most beautiful part of the vegetable kingdom, have been altered and improved by scientific culture. The habits of many have become so different as to have almost lost their identity. Single flowers have been made double, large flowers dwarfed, and colors changed. For example, the Hydrangea, which is white or pink in our common cultivation, may be made blue by using a strong ferrugineous earth. Other changes can be made by chemical mixtures of the soil.

Another example is of a plant sent in 1874, by a French Bishop of Canton, China, to Paris, the flower of which changes its color three times a day. The Bishop speaks of it as an evidence of Chinese art in leading nature out of her customary paths. Again, we learn that the modern age is not the original in changing flowers by cultivation. In the old Laurium silver mines of Europe, that were abandoned fifteen hundred years ago, recent prospecting has uncovered soils, buried deep in schists and scoria for two thousand years, from which has sprung up flowers, some of an unknown and some of a well-known species, both double and single, which have been decided by botanists to have been flowers *cultivated* by the ancients. Between two and three thousand years ago Flora was worshiped. Annually the citizens of Rome met and offered sacrifice to her, that their plants and trees might flourish. Ever since that time mankind have had their methods of worshiping her. At the present, one of our floral festivals is the first of May, when a beautiful girl is crowned as "May Queen," or the Goddess of Flowers.

There is a point to be kept in mind by any whose mind runs on the many productions of nature, and that is, the *unexpected* uses to which material, animate and inanimate, natural and artificial, can be turned. The ancients, who let the dogs run wild to do the work of city scavengers, never imagined that dogs would, in after days, become the cherished pets and companions of refined ladies. When paper was first manufactured who thought of its becoming material for water-buckets, fire-proof chimneys, pianos and car-wheels.

The influences which determine our personal character and destiny, the accidents as it seems to us, which change our purpose and lead us to this or that pursuit, frequently appear to us very insignificant in themselves. A plant in a window may change the current of our thoughts and quicken us to new existence. A bright flower or its delicious odor may lead us in paths we had no thought to enter; and those paths are surely pleasantness which leads us to deal with what, for lack of a better expression we will call *nature's fancy work;* and thus in close association with the fairest is taught "To look from nature up to nature's God."

A suitable employment for women agitates the mind of many of our great thinkers. Some of their theories have a radical tendency in one direction, some in another; while all agree that she is the *equal* of man it does not follow that she is the same, or must be employed as he is.

Women are particularly adapted to the care of flowers, as success with them depends not so much on great strength as *great patience;* and the subtle instinct which leads her to protect and nourish all helplessness — in whatever form she finds it — gives her the ability to understand the peculiarities of, and give proper treatment to each fragile flower. We use the word fragile, advisedly, for fragile they must be as the more we cultivate the more delicate they become. A flower *a la natural* can endure hardships that its cultured descendant would helplessly fall before.

Woman, then, being possessed of abilities to understand, patience to care for, and artistic taste in the grouping of plants as to their coloring does it not follow that she may find in this branch of industry not only pleasure but profit.

In many places Floriculture, at the present moment, pays better than even fruits and vegetables — though many may fancy they can depend *more directly* on them. But as with the growth of natural wealth the means of luxury are afforded more and more, the demand for flowers of every kind increase.

Flowers grown for seed, is an industry by itself; for perfume, is another; either of which is capable of great development.

The cut-flower trade of our large cities is immense. No banquet is given, no burial service complete, and no marriage properly solemnized without them.

In our interest in flower cultivation, we must not lose sight of nature's garden; where flowers are not given a gaudy hue by art, but where we find soft tints, and unassuming forms. "With cups for dew and odors for the zephyrs." Where every flower and every clinging vine has a grace which human agencies cannot produce for "Nature is the divine Creator's art, and art is rational man's creation."

## FLOWERS, THEIR ANTIQUITY, MISSION AND INFLUENCE.

BY MRS. JOHN SCOTT, PRINCETON.

It was evidently the design of the Creator that the earth should be bright and beautiful, notwithstanding the fact that it may be considered by the cold calculator as simply consisting of so many miles of inert matter.

We find its surface a vast stage, carpeted with living green, interposed with threads of silver, and varied hues of bright buds, blossoms and rare flowers — this broad expanse is relieved from monotony by alternate mountains, rocks, and valleys, thus showing in its variety of construction beauty as well as utility.

In this variety of beauty and utility we see the hieroglyphics the great Architect has written upon the face of nature, and have also discovered that its surface, with all its natural attractions, presents a book, vast and expansive, and contains in its hidden mines of

wealth and beauty the key with which to unlock the "great temple of nature."

We are apt to forget that the great foundation of floral landscape has been laid in nature by a Divine hand, and the mountains, rocks, valleys and deep gorges only tend to contrast, and add beauty to the plains and landscape.

Picture to yourself, a barren earth, no carpet of green, no beautiful landscape, no blooming valleys, no buds, no blossoms of beautiful flowers, no fertile plains, no rocks, mountains or trees, but the earth, as if a huge roller had passed over it, crushing all to one dead level, and flayed by burning winds, a desert entirely naked, where a traveler never drew his breath beneath a friendly shade, where nothing reminds him of a teeming nature, a boundless waste.

Infinitely better then is the arrangement of earth, the Creator gave us our magnificent scenery, our mountains, our rocks, our plains and valleys, enameled with trees, shrubs and flowers, all exactly suited to the circumstances in which they are placed, and perfectly adapted to the use for which they are designed; and as we see the unsurpassed harmony and beauty of the planetary system, no less beautiful are the works of God in this world; and all created things bear the impress of wise design.

Our beautiful trees, shrubs, and flowers grew spontaneously on the mountains, plains, and in the valleys of the different countries, and are as old as the creation; and, in the centuries past, these varied, beautiful productions have been gathered from their distant homes and brought together and formed vast collections. A Humboldt must scale the Andes to bring their mosses for comparison with those of the Polar regions. An Arnold must explore the forests of Java to find the magnificent Queen of Flowers, and it has been ascertained that no fertile soil is destitute of verdure, even the floor of the ocean is clothed in green.

The love for horticulture, landscape gardening, and the cultivation of flowers, have been, and are, a prominent passion, from an age dating seven hundred years or more before the Christian era, and, from the earliest dawn of national refinement, gardening was a practiced art, and has been the especial recreation of many men of genius.

It is presumed that the human mind is the most illustrious and important mechanism, eminating from the Divine hand; of the truth of this presumption we do not know, however this may be, climate, education and circumstances make us strangely different in our valuation of the beautiful, as well as the useful.

The ardent lover of mathematics and the exact sciences seldom sees beauty in the spring, with her first flowers so delicately fashioned; he hears no voice of angels in the whispering breezes, no beauty in the valley and landscape with waving forest, running brooks, and fields of flowers. All these are to him the same as the broad waste.

The mathematician looks upon the mountain that hides its summit in the clouds, and only thinks of measuring its altitude and taking its dimensions. It is true that it requires equal, if not more effort, and as much strength of mind, to study and comprehend the fields of beauty, and the handiwork of God, than it does the propositions of Euclid, or the properties of conic sections.

We do not doubt the mathematical proposition that the three angles of a triangle are equal to two right angles, but how can this or any other mathematical proposition affect the conduct or life of an individual? In fact, all the books and processes that we get from our schools give no more than a bare opportunity to the indispensibles of a general education.

We must, then, to a great extent, get our common education by observation, and dint of industry.

Whence is it that the fields and the valleys get their grace, and the long lines of meadow, mountain, river, lake and shore, conspire so much to make the landscape beautiful? In what mold were Nature's flowers cast?

The winding stream is made beautiful by the rush of its torrent for an age, and by its steady pressure upon its banks chiseling out its course to the sea. Only by the passing years of the glacier's crush, and centuries of storm and sun are the hills rounded, and the meadows and plains prepared for the growth of the beautiful in nature.

The study of the flowers is the study of the beautiful, founded on the still more evident axioms of love, joy, hope and truth, and can never be subtracted nor made to give place to cold, mathematical problems.

If the world was presided over by an intellect whose ruling passion was to revel in mathematical problems alone, and who had no love or sensibility for the beautiful, it would present a bleak and cheerless aspect. The tender plant and tiny flower would shiver in the chilling blast, receive its farewell shock, and lay its head upon the lap of earth, to bloom no more.

Thousands, however have, in almost every age and clime, turned away from the constant study of mathematics and other like sciences, to wonder, admire, and study in the beautiful fields of nature.

It is said that no botanist was ever an Infidel. God speaks by flowers, plants, and trees, as well as by prophets. Lord Bacon was a lover of flowers and always desired to have them around him when exploring the mysteries of that divine philosophy which has made his name immortal among men.

From the earliest historic ages down to the present time, flowers have mingled with the great deeds and events of mankind. The mythology of all ancient civilized nations is full of them, and they have been associated, not only with the great events, but have ornamented the festal board ; and often the most imposing part of state

dinners have been associated with them. The bride wears them at the marriage altar, and we place them reverently around our dead.

Many of the historic countries have a national flower. In Brazil and Peru the Passifloras have been their favorite flower; Germany and Prussia have their Centaures Cyanthus; France had, under the Bourbons, the Golden Lily; Scotland had its Thistle, Ireland its Shamrock, while England has that queen of flowers, the Rose.

Among the vast collection of floral gems we have culled a few, ancient in story, whose beauty and fair fame has won the title to royalty, and bore off the palm for charm of color, sweetness and grace.

Bocastre, a French traveler and writer, says but little was known by the ancients of the rose and its cultivation; however, we believe this beautiful flower was known by the early Egyptians, as several varieties were cultivated by them at a later period.

Queen Semiramis endeavored to immortalize her name, and cover up the humbleness of her birth, by the greatness of her deeds, and to this end undertook the building of Babylon, the ancient capital of the Babylonian-Chaldean Empire, about 3,000 years ago. This city, however, did not reach the summit of its magnificence until about 370 years before Christ, when Nebuchadnezzar, a subsequent reigning king, lavished an almost endless amount of wealth upon it.

Among some of the wonderful things recorded in Babylonian history, as the work of this king, are the famous hanging gardens, built in the last or new palace in the city. They were constructed in a square 400 feet on every side, carried aloft, in terrace form, until they reached the height of the walls of the city, which were 350 feet.

The level of the terrace was prepared for the soil or mould deep enough to grow trees, plants and flowers in profusion, among which was the rose. These gardens were called one of the seven wonders of the world, and were constructed by Nebuchadnezzar to please and gratify his wife, Amytis, who retained her strong affection for the hills and groves of her native Media.

In the excavations at Ninevah in 1849, in Sennacherib's palace, the walls were found to have been paneled with slabs of sculptured alabaster, and on them were found sprays of the rose bush.

From the earliest period the Greeks gave the rose the preference, and in the Middle Ages it was extensively cultivated, and used at ceremonies, festivals and fetes; and in the French and English history, especially, has the rose figured more than any other flower; and since the "war of the roses," during the reign of Henry VI, it has been the distinctive badge of England.

In this nineteenth century many intelligent florists are making it a specialty, and are producing new and improved varieties, and this plant has become an inhabitant of every civilized country, and opens

its petals to the sun in every quarter of the globe. "The flush of beauty may have vanished from its withered petals, but the perfume of the rose will cling to it still," and as the rose is the queen of flowers, so its fragrance is the queen of perfume.

This flower has been blended with the lily, to form a general emblem of frail mortality. "Consider the lily," were the words of one whose wisdom and instruction have echoed down the ages. The historic record of the lily dates back a little over one thousand years before Christ.

In the building of Solomon's temple, the Phœnecian architect had carved on the pillars of the porch, lilies; and also on one of the lavers in the temple, which was considered a masterpiece of Phœnecian skill.

The lily is held in high esteem by many, for the frequent allusion made to it in the scripture — the nativity of this plant has a wide geographical range, some are found in the cooler provinces, others deep rooted in the burning rays of a tropical sun.

The Auratum lily is considered the king of lilies, and perhaps we would not err in saying the king of the flower garden, — it is very beautiful in its royalty, and thrives better here, in the home of its adoption, than among the hills and woods of its native Japan.

The Lillium Chalcedonicum, or Scarlet Martagon, is one of the most ancient of lilies, and was blooming in the land of Palestine, long before the christian era — it is supposed to be the "lily of the field" spoken of in the scriptures, and was indigenous to all the plains of Central Palestine and in the valley of Esdrælon, situate between the Jordan on the east and the Mediterranean on the west — and when this valley, in 1799, fell partially into disuse, and was beaten to dust by the cavalry and artillery of Napoleon Bonaparte's army; this lily and the myrtle, its associate companion, returned again with the grass and verdure to bloom, as in days of yore.

Napoleon viewed from the summit of the mountain of transfiguration, the fierce and terrible conflict of the French and Turkish armies in the vale below — now as then the silvery waves of the Jordan beats upon its shores — Mount Tabor, the mountain of transfiguration, still stands in its historic grandeur — Napoleon, Kleber and Murat, and the contending armies are long since in the dust; but this lily, only a flower, remains to lay its beauty at the foot of the cedars, on time-worn Lebanon.

Among the collection of flowers to which nature has been partial, and which merits more than a passing notice, is the Passifloras, or Passion flowers — most of which are natives of South America — Passifloras Cœrula is found in Peru and Brazil.

Our first glance at this flower is like a revelation, and its beauty is of the highest order, with its delicately shaped blossom, thread-like colored stamens, and its numerous filaments, which tremble with every breath of air.

It is a fancied idea that there is a likeness of the parts of this flower to the instrument of Christ's torture — we see a representation of the cross, the crown of thorns, the scourge, the sponge, the nails and the five wounds, all of these seemingly portray the sufferings of our Savior.

It is said this glorious symbol of faithfulness to be seen in its unsurpassed beauty, must be viewed in the forests of Brazil and the mountains of Peru.

There, in the shades of the lofty Andes, Francis Pizarro and his followers found this lovely flower in 1541 — and its graceful beauty, and emblematical symbols, attracted the attention of these Spanish explorers, who came in the name of their king, under the banner of the cross, and were desolating the temples, homes and firesides of the natives, under pretense of spreading the religion of peace and good will toward men.

> "The faint passion-flower, the sad and holy,
> Tells of diviner hopes."

It is said that these Spanish robbers, in their eagerness for conquest of wealth and power, crushed this lovely flower, and also crushed the hearth-fire and altars of the natives, and stern justice wept, as she saw them sink into hopeless slavery — their numbers melted away like the leaves of the forest in autumn; but, like the flower, as it were, watched through the darkest hour of night, and being able to abide that last cold hour, before the sun makes its welcome appearance.

This was the favorite flower of the Dominicians, who tried to assuage the sufferings caused by their own countrymen, the Spaniards — these Dominicians were assiduous cultivators of the soil, and plants were spread from place to place, and this flower was conveyed to Spain, where it opened its starry-leaved blossoms, when, in its native home, the hearths were cold and the scepter of the Inca was gone forever.

Flowers will preserve their reputation through ages, and through subversions of empires, and internecine wars, and will see generations succeed each other and pass away, without losing the homage rendered, or love borne them.

Many flowers have we passed by unnoticed, but as well might a botanist presume to claim the fee simple of all the land he travels over in gathering together a large collection of plants and flowers, as for us to mention all the different plants, and their own peculiar endowment of color, charm and beauty, when we are told by such authority as Bentham and Hooker that there are about ninety-six thousand species of plants of the earth, in the flowering divisions — we can say we look at this sea and we find it shoreless.

For the tiara we weave for nature, we bring a few flowerets, rich in precious gifts — Jussieu's offering from the Codilleras is the Helio-

trope. Leonard Fuchs brings frum Peru the Fuchsia, and from the spicy isles of the Indies is borne the Tuberose, while the flora of America, assisted by Japan and Italy, contributes the Pansy, and in our woodlands we will brush away the leaves and gather the first flowers of spring, and we will proffer to nature this crown as a fit guerdon for her blossoms she has scattered so freely.

The empire of cultivation is universal, from the tiniest flower to the education of the mind, which itself is but the flower of the universe, nurtured by nature, and, as the family circle need books that will refine and broaden the culture of home, so they need the moral and refining effect of flowers—there is a mysterious influence which creeps over the heart almost imperceptibly, arising from these bright treasures of nature, that make us purer and better. Books and flowers go hand in hand—the outer circle is but an index of the inner circle—we would have flowers in every home, as well as a library.

Make home attractive with flowers; although many may not be able to indulge in novelties, costly palms and orchids, yet, they can have flowers that will give more blossoms, and be more satisfactory to the greatest number, and will be duly appreciated when the storm of winter beats without and the thermometer marks zero,—and well-kept lawns and gardens are hidden or negatived, and have relapsed into a state of nature, and title deeds are buried deep beneath the snow.

However, by a few the love of the beautiful in nature may be so dimmed by the cultivation of the practical, that they cannot see and enjoy the beauty which the hand of a bountiful Creator has so freely bestowed on us, but we would say, "The harp holds in its strings the possibilities of noblest chords, yet, if they be not struck they must hang dull and useless."

The youth should be taught to read in the great book of nature; they will there find a charm, a boundless interest, which will be a guard for innocence, and a security for happiness; they should be taught to cultivate and love plants and flowers, and this care and love will ennoble and elevate the mind, refine the affections, mould the habits of the maturing man and woman.

There are no better signs of human progress than the evidence we see all around us; flowers are to be seen alike in the dwellings of the rich and the poor; they are no respectors of persons, their bloom is no sweeter in the conservatory or grounds of the millionaire, than in the poor man's humble cottage or garden—they reward the beggar boy's tender care as lovingly as if he dwelt in brick or stone mansions.

How often, in the cities, we have seen the poor, neglected children stop and admire the flowers in the florist's window, or look wishfully at the possessor of a bunch of them—they have never been taught to care for, or love them, yet the sight of their beauty kin-

dles in their hearts that love that does not die, and as has been said so beautifully by an English poet,

> "Your voiceless lips, O flowers, are living preachers,
> Each cup a pulpit, and each leaf a book."

As we have visited the different hospitals and charitable institutions in cities we have seen what a mission flowers are capable of; how pain and illness would be for the time nearly forgotten, the drooping and wounded spirit, and saddened heart cheered by these living sermons which come not from the voice of man, but from the hearts of the lovely blossoms, which silently teach, them of that fairer and better home, where flowers never fade.

Strong evidence of the progress of refined culture is seen in the beautifying of our cemeteries with plants and flowers; there is a symbolism in the introduction of flowers here, which makes them especially fit to adorn the last resting place of those who have passed through the gates and are solving the great mystery.

> "Death is a beautiful necessity, without it, there can be no new life."

Whence is it the trees are dark and gray in their winter's sleep? This is but a resurrection of what seemed to be their death.

Men are sometimes startled by some sudden weakness, that portends decay and they are dismayed at the sudden thought of death — then how cheering is the hope of immortality; life is like a flower, that only buds here, but blooms in another clime, for,

> "Spring will come to the mouldering urn,
> And day will dawn on the night of the grave."

The flowers forget not to bloom in the spring and decay in the autumn. The golden days that herald the approach of autumn linger long, apparently, to give a longer life; but the rustle of the dead leaves have the fatal dry rattle of decay; these emblems of death cling gallantly to the maple's trunk, and with gathering hectic flush defy death.

It is true, that every succeeding season of the year is as intrinsically important as the grand results they bring.

The flowers are only the sheath of the seed, and the seed only an advancing step towards other flowers, foliage and fruits.

But we are sensibly reminded by the falling leaves and nature's decay, that the life we are now living is as evanescent as the flowers of the valley.

There are few people who will accept Coleridge's dictum that "In nature there is nothing whatever melancholy."

The sad sobriety of William Cullen Bryant's poetic genius has been touched into some of its most characteristic strains by the approach of autumn with its falling leaves. He it is who said, "the melancholy days have come, the saddest of the year."

The poets have never wearied of repeating their impressive poetic legends of autumn's decay. Take the grandest passage in the grandest poem of the world (Milton's "Paradise Lost"), or the most sublime passage in Thomson, on the Seasons; follow them and their gloomy description of the fleeting seasons, by which we are carried away as a departed Sabbath of earth, or as a tale that is told.

They teach us so impressively the lesson of the general desolation of nature. They appeal to the natural human sympathies and the heart as very many of the poetic legends of such minds do; and we are led to look forward to that autumn's decline which time must bring to all.

We are reminded that after we shall have beheld a few more changing seasons, all that now bless and all that now convulse humanity must give place to other active workers and busy feet; the grandest pageantry of life will have passed away; the loudest note of triumph or conquest will be silent in the dust.

But surely there will be adequate compensation for our journey through the changing seasons of so brief a life, for it has been well said:

> "No winter shall be in Heaven; no gathering gloom
> Shall o'er that glorious landscape ever come.
> No tears shall fall in sadness o'er those flowers
> That breathe their fragrance through celestial bowers."

The Committee on Final Resolutions presented the following

REPORT:

We would recommend the usual compliments to the various railroads and hotels which have granted concessions to our members. We would also tender our grateful regards to the Messrs. Bryant and others who have labored so assiduously for the comfort and pleasure of those attending the meeting, and to the ladies and gentlemen who have furnished us such excellent music. Also to the Bureau County Agricultural Society, for furnishing this convenient hall for the use of our Society; and to the press of Princeton for the liberal notices of our meeting.

C. N. Dennis,
F. I. Mann,
*Committee.*

Adjourned to meet at Alton the second Tuesday in December, 1888.

# DEFERRED PAPERS.

For lack of time to read and discuss them, the following papers, which had been sent in to the Secretary, were referred for publication:

## NOTES OF OBSERVATIONS ON INFLUENCE OF STOCK ON THE BUD.

BY H. C. FREEMAN, ALTO PASS.

The effect of stock on the bud has been somewhat discussed, and so far as has come to my knowledge, only on theoretical grounds.

I propose to describe, briefly, some personal observations on this point, as effecting peaches. A peach — a seedling of somewhat remarkable and distinctive characteristics, was budded on young nursery stock according to the common practice. All the buds were taken from a single tree, the budding all done at one time, and the trees all set in the orchard together at one time. The observations to be described have been repeated for several years from the same individual trees.

The fruit of the parent tree from which the buds were taken, was large, high colored, juicy, rich flavored, yellow meat, free stones, and peculiar shaped stone. All of these features were modified on many of the bearing budded trees.

The buds when fruited, although all showing the mother trees, presented on many trees unmistakable differences, and to a close observer accustomed to peaches, quite marked differences.

From an idea of securing greater hardiness, but perhaps more from greater ease of getting them in quantity, it is the practice to get the seed of the common old southern varieties of small seedlings for planting to grow nursery stock to bud on. In this way a variety of pits will come mixed together, but, for the most part, freestones. Of such I have seen many— it seems to me as many as fifty varieties — in bearing. Some of them, for quality of flavor, equal to the best of the larger, choice, cultivated varieties, the objection to them for market being only their small size. The "plum peaches," or clingstones, though small, are generally good, and some are of particularly fine quality, the objection for market being only their small size.

Of the clings in this class of "plum peaches," there are one or more varieties with high color, dark skinned, with a rich purple shoulder.

Of the freestones, there are several of very light color, both of flesh and skin, and some that are white both meat and skin; these latter are less juicy and less flavor than the others. All of these are cultivated in orchards in the South direct from the seed, and without budding. They are dried in large quantities, and formerly were distilled in large quantities for peach brandy. Another less common, is a yellow-skinned, yellow-flesh, and almost lemon shape, and with a longer, pointed pit. All of the above described are small peaches—the lemon-shaped a little larger than the others, and a fair, medium-sized peach. There is another, locally known as an "Indian peach," that is very large, fine looking, and striped like red-streaked apples, yellow flesh and red striped meat to the pit, the color growing deeper around the pit. This peach is intensely acid, unlike the generality of peaches in this respect, and in its flavor. It is a freestone.

When the budded trees came into bearing the differences noted were, that on some trees the rich high color of the mother tree from which the buds were taken never appeared on a single peach. It was toned down, lighter colored, and with scarce a trace of a blush. The fruit was smaller also. Some trees showed a less juicy fruit—that is, some of the paler colored, fruited with less firmness of flesh than the mother tree, and the pit was smaller.

The lemon stock imparted its lemon shape partially to the form, as well as its color partially, and altered form of pit was noticeable also.

The "plum peach," or cling-stone, was of same color as the mother peach, but darker—the observation was that the color was intensified, particularly in the shoulder, that became so dark it would scald when exposed to the sun on the tree, from absorbing more heat, and the dark surface of the shoulder would shrivel in consequence. In these there was a tendency to adhere to the pit not found in any of the others, or the mother tree. The juiciness and flavor of the mother tree being similar, there was no difference noted.

Lastly the "Indian peach" was recognized, but this was only in a single tree. There were many of each of the others. The largest peaches of the orchard were from this tree that showed Indian blood. They were very sensibly striped, so that any one would notice it—the meat as well as skin—and although the mother tree flavor was there it was so acid as to impair its quality.

Another thing noticed. The little white peaches have a very heavy velvet coat. These light-skinned peaches showed a heavy velvet coat, not on any others to the same extent, and the "plum peaches" are quite smooth in that respect. The budded ones showed this smoothness and freedom from velvet also.

An advantage in making these comparisons was having the mother tree in bearing also, in the same orchard. These features

were so prominent that all the members of my family noticed them, and certain trees were selected for their special fine qualities, and others avoided on account of the contrary.

These differences, as herein noted, are full of suggestions, and indicate that a given peach, of special qualities, may be run out in time by indiscriminate budding or miscellaneous stocks. It also indicates that the earliness or lateness of fruiting and maturing the fruit may be affected, and that the tenderness of a variety may be partly bred out by putting on a hardy stock, and the reverse can also be the case.

It further shows that to preserve a fine peach, if a seedling, it had better be propagated from seed than by budding; and next to that to preserve its qualities, it should be put on a stock as near like the parent as possible.

## MULCHING APPLE-TREES.

BY PROF. G. H. FRENCH, CARBONDALE.

It may be remembered that the conclusion reached in my investigations last year, as to the cause of the death of so many apple trees from what was known as "winter killing," was that they had too little moisture during some part of the growing season. This would not occur every year, as seasons would differ in the extent of summer drouth; nor would every dry summer be followed by a great loss of apple trees, for the reason that some seasons that had been very dry during July and August would be followed by a mild fall, thus enabling the trees to mature the growth made after the September rains. The remedy proposed to counteract this evil was mulching. This was based upon a number of observations in different parts of the State, the idea being that a coat of hay, straw, coarse manure, or something of the kind, scattered over the ground several feet round the tree, would keep the ground containing the roots of the tree moist at a time when the soil outside the mulching would be dry and hot.

To test the value of mulching on trees, I last spring asked a few persons in different parts of the State to mulch a few trees, leaving others of the same kind without mulching, and note the result as the season progressed. Conditions have been such that I have not been able to visit any of these orchards this year, and hence can only summarize the reports of the different persons who made the experiments.

Mr. D. W. Lacy, of Belvidere, Boone Co., says: "I have made the experiment of mulching a few apple trees, leaving some without mulching, and have come to the conclusion that it is the only way to insure the production of the apple. This has been a poor season for fruit with us on our prairie, but the gentleman I spoke to you of last year (Mr. Tripp) has sold in our market a large amount of apples

this season. He says his success is owing to the care he gave his trees, including mulching; but he also says that he has lost a great many trees."

This letter is dated October 30, 1887. It may be remembered that the Mr. Tripp, to whom Mr. Lacy refers, was spoken of in my paper last year as one who had better success than any one in his vicinity, and that his success was regarded as being due to mulching his trees. That it does not save all his trees is shown by the latter part of Mr. Lacy's statement, but that it does save the greater part of them and help to ensure a good crop of fruit is beyond question. Of course, it will not do to depend on mulching alone, as though it were a panacea for all the ills to which the apple tree is subject; for this, as well as other cultivated plants, needs care, and the proper treatment, that they may give the best results, otherwise there will be a tendency to revert back to the original stock, or wild apple.

Further on Mr. Lacy incidentally says: "I have given up setting apple trees, although I have a few in a growing condition on a piece of land devoted entirely to them and grass. Grapes are the surest and easiest fruit I can raise, and I intend to enlarge my vineyard."

I think Mr. Lacy is wrong in one point, and that is the entire abandonment of apple culture. My suggestion would be to set a few trees each year, if not more than half a dozen, selecting such varieties as have been proven to be the hardiest. This need not interfere with the enlarging of his vineyard; for with proper care I do not see why he should not find both profitable, and at the same time secure a crop of apples for home use, and supply some of his less fortunate neighbors. Grapes can not wholly take the place of apples, and if apples can be raised in Iowa and Wisconsin they can be in Northern Illinois.

Another man asked to experiment with mulching was Mr. G. W. St. John, of Centralia, Marion County. He is a man of some experience in fruit-growing and gardening, and whose ground is in a good state of cultivation and well fertilized. He writes me under date of Nov. 8, 1887, as follows:

"Early last spring I mulched nine apple trees, some large and some small, of three different varieties, and in different parts of the orchard. The mulching was wheat straw that had been used for bedding cows, and considerable manure went with the straw. I put on only fair quantity. I could not see that the trees were in any way benefited."

He speaks incidentally of other orchards, as follows:

"Meigs Meyers' orchard bore a partial crop of quite nice apples. The leaves fell before those in other orchards. The orchard belonging to Dea. Miles (the one we went through last year when we went to Mr. Perine's) has done the best of any within my knowledge. He sprayed with Paris Green."

Mr. Meyers' orchard is the one spoken of in my article last year, as casting its fruit and leaves so early, the leaves also showing a somewhat diseased condition. It may be remembered that lack of drainage was the cause given there. Dea. Miles' orchard was noticed last year as one that was well cared for. In Mr. St. John's orchard mulching did not seem to produce any very decided results.

In regard to mulching young trees, I would quote the following from a pamphlet issued by J. Webster & Son, nurserymen, of Centralia:

"It is of vital importance, and should never be neglected. It prevents the moisture from escaping, and maintains an equitable temperature about the roots. The materials used may be long manure, litter, straw, grass, hay, sawdust, or tanbark, which should be spread on the surface around the tree for the space of from four to five feet, and three to six inches deep. Bearing trees may be benefited by mulching heavily in the winter, which will tend to prevent an early development of fruit buds, enabling them to escape the effects of late frosts. We cannot recommend mulching of newly-planted trees earlier than the 25th of June."

In another paragraph, under the title of "A Word of Warning," he says, further:

"We do not recommend indiscriminate mulching. Our readers must be governed by their surroundings, and good common sense. There is some good to be gained by mulching in the three months of summer. In the fall and winter months there are in very many places serious drawbacks to the mulching system, on account of field mice of various kinds. * * It is by far the safest to take all mulch from the trees at the time of fall rains in October. Clear away all weeds and mulch entirely. Examine thoroughly for borers about the collar and trunks of trees."

Mr. S. T. Brush, of Carbondale, Ill., mulched the whole of his orchard last spring with manure and ashes, some coal ashes and cinders being used, I believe. From several talks with Mr. Brush, I find that he is a firm believer that one reason many of our orchards do not yield better crops and present a better appearance, is that they lack nourishment. The mulching was done largely to supply some of this lack, and at the same time to equalize the moisture. He thinks the mulching did his trees a great deal of good. Of his young trees, however, he thinks he did not mulch soon enough, as many of them died this year, it being an unusual one in the severity of the drouth.

I can say the same of some trees I set last spring. I put grass round them in June, during some of the rains, but noticing that this afforded a harbor for cut-worms and army worms, some of the first climbing up to eat the apple-tree leaves, I cleared it all away from the trees, leaving it away till the caterpillars had disappeared. The result was that the ground was then drying, and my trees would

have died if I had not kept them alive by watering them once in about ten days. Other parties were asked to make experiments, but these are all I have reports from.

In conclusion I may say that the result of this year's observations is a confirmation of the conclusions drawn from my last year's investigations. This has been a phenomenal year in the extent and severity of the drouth, that part of the season being well calculated to test the efficacy of the mulching process. I have given above the whole of the notes in the replies to my questions, whether they favored mulching or not, because I think, like Mr. Webster, mulching is not an unmixed good, but must be mixed with common sense in its use. Thorough fertilization will, without doubt, do much to render mulching unnecessary in the Middle and Southern parts of the State, but I believe it to be safer to mulch in the Northern part of the State, than it is to allow the trees to take their chances in the vicissitudes of wet and dry seasons, and cold and warm winters, that begin with early severity, or when it is so mild that fall and winter seem to blend. If the beginning of the winter of 1887–'8 shall be so blended with the closing fall that there is a gradual transition from one to the other, trees will ripen the wood that grew after the September rains, and, no matter how cold the weather may be in January, the trees will pass the winter with but little damage; but should the reverse be the case, death to many apple trees must be the result. The dry October and fore part of November have acted as a check upon extensive growth since the middle of September, which, of course, is favorable. If we can keep the soil about the roots of the trees moist during the growing season, so that the trees shall have more of the influences they have in the Southern Peninsula of Michigan, and in the Northern Atlantic States, the cold winters will not produce the results they frequently do with us, any more than they do there. In as far as mulching will do, this it is a decided advantage.

## A PEN SKETCH OF BENJ. D. WALSH, FIRST STATE ENTOMOLOGIST OF ILLINOIS.

BY F. W. GODING, M. D., RUTLAND.

Benjamin Dann Walsh was of English extraction, having been born in Frome, Worcestershire, England, September 21, 1808. Very little is recorded of his early life, but from his own notes we learn that he was always kept at school under vigorous rule, where habits of thorough study were inculcated, which had much to do with the success of his entomological studies afterward.

He graduated at Trinity College, Cambridge, about 1830, receiving the degree of Master of Arts, and intended entering the ministry. The inconsistent conduct of some of his fellow students caused him, however, to give up this idea, he having a strong hatred — ever ready to crop out — for all forms of hypocrisy.

Although paying but little attention to the study of entomology, he made a small collection of insects while living in England. He published a large volume on university reforms, one entitled "Walsh's Comedies of Aristophanes," besides contributing regularly to the English periodicals and newspapers. Mr. Walsh was married in 1836. Two years later he came to this country, where his wife had relatives residing near Rock Island. Purchasing a farm in Henry county, near Cambridge, he determined to retire, in part, from the world, and lead the life of a philosopher. Here he lived for thirteen years, performing his share of all the duties of the farm. In 1846 the "white grubs," "wire worms" and "cut worms" attracted his attention from their ravages, and he at once began to search for a remedy. It was here that he made his first entomological observations in America, which were followed by such brilliant results in after years. In 1851 he removed to Rock Island, Ill., and engaged in the lumber business, in which he continued for seven years, at the same time taking a lively interest in political matters. In 1858 he was elected alderman on the Republican ticket, and, after exposing various frauds, he resigned the office, about the same time retiring from business with a competency.

Mr. Walsh now began to devote himself entirely to his favorite science, and, strange though it may appear, his active labors extended over scarcely a dozen years. The first published account of Mr. Walsh as an entomologist is in the report of a lecture which he delivered before this Society in Bloomington, January, 1860. About this time he became a regular contributor to the agricultural and horticultural press, his articles being always of a popular character and very interesting.

In 1861 he was awarded the prize of $25 for the best essay or suggestions for diminishing the loss sustained by insect ravages, offered by the State Agricultural Society. This paper, entitled, "Insects Injurious to Vegetation in Illinois," was published in the transactions for that year, and was followed in a subsequent volume by another bearing a similar title. In both, his aim was to arouse the agriculturists to a sense of the immense losses they sustain from the depredations of injurious insects, and the necessity of a more general knowledge of these little foes. It is probable that these articles did much toward opening the eyes of those interested, to the need of a State Entomologist. From 1862 to 1866 about a dozen scientific papers emanated from his prolific pen, appearing in the proceedings of the Boston Society of Natural History, and those of the Entomological Society of Philadelphia. In October, 1865, the latter mentioned society commenced the publication of the *Practical Entomologist*, of which Mr. Walsh was associate editor during the first year, becoming sole editor of Volume II.

Your society, ever ready to take the lead in every progressive movement in which the tillers of the soil are interested, petitioned

the legislature to appoint a State Entomologist, naming B. D. Walsh for the place. That honorable body, at the close of the regular session for 1866–'7, passed a law creating the office of State Entomologist, with a salary of $2,000 per annum, he to be appointed by the Governor, with the consent of the Senate, and for a period of two years and until his successor is appointed and qualified. Owing, probably to the late day at which the act was passed (February 27, 1867), the Governor made no appointment. This society thereupon passed the following resolution:

"That the President of the society be authorized to engage Benj. D. Walsh to immediately commence entomological investigations in relation to horticulture; and he be empowered to pay out for that purpose a sum not exceeding $500 from the legislative appropriation. This action is taken in case of a failure to appoint."

At the special session held in June, 1867, the Governor sent in, on the 11th of that month, the name of Mr. Walsh for confirmation, but the Senate postponed all action upon it until the next regular session, in the winter of 1868–'9. The officers of the Agricultural Society agreed in private to have the amount of the regular salary appropriated to him from the society's funds if he would continue with the duties of the office should the Legislature fail to reimburse him. Acting on the advice of the leading men interested, he took up the role of Acting State Entomologist, his first report for 1867 consisting of 103 pages, illustrated by one plate containing ten figures, appearing in your transactions for that year as an appendix. This report is one of the most scholarly of any of the official entomological publications; and had it been properly illustrated would have been a fitting rival to the classical work of Dr. Harris. At the time of his death he was getting ready to write his second report, which was to have added a fully illustrated edition of the first, the whole to have contained about three thousand dollars' worth of steel plate illustrations. In writing of his appointment and labors during this period I have entered into detail to show that it was owing almost entirely to the exertions of this society that the office of State Entomologist of Illinois, which has done more than that of any other State to fulfill the object for which it was conceived, was created; and to it the credit belongs.

In September, 1868, Mr. Walsh and his intimate friend, Mr. C. V. Riley, began the publication of the *American Entomologist*, with which, no doubt, you are all familiar. Its columns contained articles devoted mainly to entomology in its relation to horticulture and agriculture. In these columns, and those of the *Practical Entomologist* he is seen at his best as an entomological writer; and from the classic style of these articles he early acquired the sobriquet, "Prince of Entomologists."

While returning from the postoffice along the Chicago, Rock Island and Pacific Railroad, Friday, November 12, 1869, he was run

over by a passenger train, severely injuring his left leg. Amputation was found necessary, and was accordingly done, though without avail for he died the 18th of the same month — on Thanksgiving day. He received the news that his life was rapidly drawing to a close in a philosophical manner, declaring that he had lived beyond the usual time allowed to man, and was ready to die. Though not professing any religious faith, he met his fate with the calm dignity which befits one who has labored honestly to leave the world better for having lived in it.

A contemporary says of him :

"And thus this truly great man, in his special department of science, has been abruptly taken from our midst. * * * * We are not stepping beyond the bounds of truth in asserting that Mr. Walsh was one of the ablest and most thorough entomologists of our times; and when we consider his isolation from any of the large libraries of the country, and the many other disadvantages under which he labored, we are the more astonished at the work he accomplished. * * * * And though he had some of those eccentricities which frequently belong to true genius; and though he made many enemies by his bold, outspoken manner, and his hatred of all forms of charlitanism; yet those best acquainted with him know what a deep feeling, tender and generous heart lay hidden beneath the rough and uncouth exterior."

His magnificent collection of insects, as you are well aware, was destroyed in the great Chicago fire, excepting a few drawers of coleoptera and lepidoptera. When we consider the many years which this indefagitable entomologist had devoted to the accumulation of this collection; and still more, when we take into view the scientific research, and the extensive correspondence and exchanges by which he had succeeded in attaching to almost every specimen its correct scientific name, it is a difficult task for the lover of this science to reconcile himself to this almost irreparable loss.

## WHAT GOOD IS ACCOMPLISHED BY HORTICULTURAL SOCIETIES.

BY HON. JOHN M. PEARSON, GODFREY.

The mere asking of the above question implies that it is possible to give a negative answer, and that some one may deny that any good results come of our work.

I will, in what I have to say, confine myself to my own experience and observation. I do not say that these societies have done all the good expected of them, or all of which they are capable, any more than I would claim that the church had done all its appointed work, promptly and thoroughly. There is still much to be done by both, and no present prospect of a finish.

Good fruit ought to be plenty, and within the means of all. Good vegetables, in good condition, are necessary for health. These

are the aims of our Societies, and will commend themselves to all. Now, how much have these aims been directed by our work?

Negatively, I think, the great planting and eating public have been helped to avoid imposition. No horticultural society can exist for long, whose members do not, for themselves, perform much pioneer and experimental work. In the rush of competition to secure business, and amid the crowd of new candidates for favor, and the amazing statements of advertisers, there is a need for some one to put time and money into experiments to prove all things, in order that we may hold fast that which is good.

Life is too short for any one man to do this for himself, but in our Society, from its earliest beginnings, some of us have been continually doing something of this sort, and reporting results for the good of others, not only of our own members, but, by publication, free to all. The same course is pursued relative to purchases, and we soon know where "stock" can be bought at the lowest rate, for the best stock.

In disposing of products we, in our Society, have not, as yet, "joined hands," and do not see our way clear to do so. We are told that some societies have made such efforts.

Our Alton Horticultural Society has now lived for more than thirty-five years. At first, our members were only amateurs — the whole county did not contain a "professional." But as I now look back, and call them up in memory, I think they were, in many ways, a superior lot of men. They aided each other by free conference as to varieties, methods of culture, soil and exposure. There were no trade secrets jealously kept for selfish ends, but each was willing to give of his experience for the common use.

Our Society has not been the means of making any one rich. Our members have been able to live comfortably, and rear families of intelligent boys and girls, and generally believe that "man does not live by bread alone." I am free to say that the same amount of labor and intelligence employed in many other ways would have produced more money.

For outside influence, I think I can show, in the community around us, greater love for horticultural products, with more discriminating taste and fuller knowledge of methods of culture than can be shown in any county where such societies do not exist. Many men of slender intelligence have learned to practice what we have taught, and even to excel their teachers. The social features of our Society have been very valuable, and this, of course, depends upon the management. Those who feel the need of such intercourse can readily supply it. Some excellent societies have paid no attention to this, and have done good work. In these cases the work more resembles a school or a business exchange. Both purposes are laudable, and the members of each must judge for themselves. Most of our members are more or less engaged in other branches of farm

work, and I have found them better farmers than they would have been but for knowledge gained in the Society, and better farmers than the average of their neighbors. I wish to add that we, as a society, can do more in the way of securing reasonable rates of freight and express charges, than if every one was compelled to hunt by himself,—not that we have sought for special rates for our members, but, by carefully estimating the crop and conferring with agents better rates have been given to all, and the companies would better prepare to do the work and thus avoid delay, when delay meant loss. So much for the local Society, which I regard as the most important. Now for the larger ones.

State societies, like ours, collect results and preserve a record for all. They can, and ought to, provide at our annual meetings, addresses and papers from specialists in the various fields of work, and from scientific students, such information as they alone can give. Many problems in horticulture have now gone so far that ordinary observation is useless, unless supplemented by the investigations of scientific men. Such are the mysteries of "pear-blight," neither our local or State society would allow discussion on this much-discussed plague. We must listen to science, when she is ready to speak, and, in the meantime, we will not let her forget us. Valuable results have already been obtained, simply because we insisted upon answers. Capable men have heeded our requests, when, in all probability, without us, no questions would have been formulated, nor answers given. State societies can, and should, help in perfecting our nomenclature. It is the cause of loss every year that we yet have so many synonyms for the same fruit. Thrifty nurserymen are thus enabled, like the proverbial landlord, to furnish ram, lamb, sheep and mutton from the same joint. Our State Society is able to keep our matters prominently before the public, and thus secure the modest amount of appropriation asked for by us. No local society could do this. I will not omit the further benefit received, and acknowledged, by all who attend our meetings,—that is, the forming and maintaining of long and dear friendships among ourselves.

## FORESTRY.

BY MILO BARNARD, MANTENO.

Seeing nothing on the programme on the forestry question, I will, at the risk of appearing presumptuous, endeavor to say a few words in the interest of a subject that I think should engage more deeply the attention of the American people, and will take for a text, or foundation, these words: "And the leaves of the trees were for the healing of the nation." Some of you, perhaps all, know where to look for these words—in the last chapter of Revelations, and part of the second verse. Although the words appear in a description of the New Jerusalem, revealed to John, and is applied

to the land that is believed to exist beyond the river of death; still, if leaves are such a blessing in that far-away land, I cannot conceive why they should not be an equal blessing in the rudimentary world we now inhabit; and with due reverence for the sacredness of the words quoted, will proceed to make the application.

In healing a nation or an individual we pre-suppose there is sickness, wounds, or bad condition in some way. Nations may be supposed to be sick, when their resources are exhausted, their lands impoverished, their wealth squandered or wrested from them, and their status reduced to a low ebb, as compared with more prosperous nations.

But national sickness, brought on by destruction of the forests, is of slow growth; hence more insidious, dangerous, and certain in its deadly work, therefore it is necessary, to obtain even a faint idea of the magnitude of this disorder, that our consideration of the subject should extend over long periods of time, and cannot be treated in a short paper except in a general way.

Let us in imagination go back to the land of the Orient, the land where civilization was born, to ancient Egypt, and take a look along the storied Nile. Here we find those might structures of stone, the pyramids that were upreared so long ago that all record or tradition of their building is lost, and scattered along the river on every hand we see the ruins of once populous and mighty cities. There is Memphis, Luxor, Carnac, and many others, besides that wonderful city of Thebes, that was in ruins before Moses was born but is grander to-day, after unnumbered centuries have bleached its broken columns, than modern cities in all their paint and prime. But what can we say of the country; except a narrow strip overflowed by the river it is a barren waste, unfit for cultivation and affording little pasturage.

The question naturally arises, Was it always so? Could those mighty and costly works have been built in a desert land, without railroads; and how were the vast hordes of people maintained; and where was the wealth produced? Undoubtedly, this was once a land flowing with milk and honey; when the hills and mountains were clothed with a magnificent growth of timber, and the abundant leafage held up and kept strong the mighty nation. But as time rolled on the trees were cut away, the lands dried up and exhausted, could furnish no sustenance for the inhabitants, and the nation became sick and weak, and so remains unto this day; and if it was not for the small amount of healing that the Nile brings down from the leaves that grow upon the mountains hundreds of miles away, the land of the Pharaoh's would be sick unto death. How kind and provident is Nature in her healing.

In the days of Pharaoh this land became densely inhabited, in fact, too thick to thrive. At least, so thought Moses, and he organized an excursion or land-looking party on a grand scale and struck

out for pastures new, but there being no railroads in that part of the country at that time, the party was forty years in going comparatively a short distance, but it made little difference, as they lived off the land they passed through, and their fare was the best the land could afford — they were served with quail on toast. And from this time on we have written history touching the subject under consideration, and we find by the record that this land — the Israelites went up to possess it, the land of promise — was a goodly land, rich, fertile and prosperous, the hills and mountains clothed with magnificent forests, its valleys abounding in groves of olive and pomegranate, and along the streams the vine flourished in wanton luxuriance. So large, in fact, were the clusters of grapes that it required two men to carry one bunch on a stick. Here under the benign and healing influence of unnumbered millions of leaves we should expect strong, vigorous and powerful tribes or nations, and it was so. There were giants in those days in this land of Canaan, and their cities were so strong and their defenders so valiant that the children of Israel, fierce and blood-thirsty warriors, though they had got to be under the leadership of Moses and Joshua, would not have been able to take the land had not the Lord helped them.

But this land flows with milk and honey no more, one man of average strength is able to carry any bunch of grapes that grows in all her borders. Giants in stature and intellect no longer tread these hills and valleys, timely rains no more visit her once fertile vales. Sterility and starvation sit in solemn silence on her bald and barren hills, many portions of the land are entirely deserted. Why this great change? Simply because the leaves that were for the healing of the nations were destroyed, as they were in Egypt, and could not do their legitimate and necessary work. And the curse that to-day rests upon the hills of Moab is due to the destruction of the forest that once crowned them with grandeur and beauty. And when we look through the circling ages and view from a horticultural stand-point, by the light of the nine and twenty centuries since Solomon built the temple, we are surprised and pained at the wanton slaughter of those grand old monarchs of the forest — the cedars of Lebanon — what sad havoc this army of thirty thousand choppers must have made amongst those beautiful and useful trees. Could Solomon in his wisdom have realized that the leaves of the trees were for the healing of the nations, methinks he would have built his house of brick, and preserved his forests and required the planting of others, then this land of promise would have remained a fertile and goodly land to the present day, and the Jews would not be as they now are, sojourners in all lands.

But the mistakes of our away-back forefathers have at last in modern times been productive of good; many nations and people are awakening to the importance of this subject. Germany and France have called a halt, and are doing something to regulate forestry and

timber-cutting by law, requiring trees to be planted when others are removed.

But Spain stayed not the woodman's ax, and her forests have been swept away, and in a comparatively short space of time she has been reduced from a first- to a third-rate power. And reading the future by the past it will not be long before her sovereign will have as little voice in the councils of nations as does the so-called ruler of the land through which flows the Nile.

But old despotic Russia has come nearer, perhaps, than any other nation to solving the forestry question, at least they have reduced it to some kind of system and keep a certain per cent. of their area in timber.

They not only plant forests if needed where the trees have been removed, but are pushing out their plantations into the bald, wind-swept steppes, well knowing that the leaves will heal these sick and sore waste lands, on which no human can live, and make it a fit and pleasant abiding place for man.

But they do things there different from what we do, the power behind the throne (or on it) says, plant so many acres of trees in this or that province, and it is done; or this power says, build a railroad here, and a city there, and it is done without argument, no counter interest attempting to defeat the measure. So there is some good even in a despotic government that an American citizen is forced to acknowledge.

The land system of Great Britain, though very faulty in a general sense, has resulted in good in one particular at least: it has been the means of keeping large tracts in forest for the preservation and breeding of game, and all the people have been benefited by the healing power of the leaves.

But what can I say of our own country? I can say this, and sorry I am to have to say it: We, as a nation, are following in the footsteps of the ancient Egyptians and the Jews, as far as the destruction of timber is concerned. And unless we face about and say, "thus far, and no farther, shalt thou go," and force the woodmen, by stringent laws, to spare the trees, it is only a question of time when the antiquarian will dig amid the ruins of New York, Washington, Chicago and other large cities, and speculate on the kind of civilization we possessed, living two thousand years after the Christian era, and did not possess wisdom enough to preserve our woodlands; did not know that the leaves of the trees were for the healing of the nations. But in the absence of any adequate action by our government, there are, and always have been, earnest, far-seeing individuals who have raised their voices against the self-destroying practice of denuding our mountains, hills and valleys of the covering nature placed there for a wise and beneficent purpose.

There is one feature of the forestry question that I have never been able to satisfactorily explain, even to my own mind. I refer to

the fact (if fact it is) that men in our country take little or no interest in this matter until they have passed the meridian of life, and their gaze is directed toward the setting sun. No doubt there are exceptions, but this is the rule so far as my limited observation goes. Allow me to cite a few examples:

Warder, in his old days, wrote and talked almost constantly on this subject, disseminating much valuable information, and doing much good.

Scofield was on the shady side of fifty before he engaged in tree planting, becoming very enthusiastic in his favorite pursuit in his old age.

Father Bryant, as he neared his journey's end thought and talked much on this subject, and wrote a book on forestry.

Minkler, as he nears life's golden sunset, feels a yearning for the trees that he has planted, and an undying love for the leaves that are for the healing of the nations.

As the frosts of many winters silver the locks of friend Minier, he, too, falls into line, and his mild, persuasive voice is raised against the wanton, wicked and useless waste of timber that is seen on every hand.

And last, though not least, Mr. Gaston elevates himself above his fellow man, and with a giant walnut tree in one hand and a catalpa in the other, cries mightily, with a loud voice, "More leaves for the healing of the nations!"

## REPORT OF THE CARTHAGE FLORAL GUILD.

BY MRS. FRANK M'MECHAN, SECRETARY.

In the year 1883, a few ladies of Carthage, thinking it would benefit them to exchange ideas in regard to floriculture, held a preliminary meeting at the residence of Mrs. Dr. Robbins, to take action in forming a permanent organization. A second meeting, at the home of Mrs. Dr. Noyes, resulted in a complete organization of the "Carthage Floral Guild."

A constitution was read and adopted, and the following officers were elected for the year: President, Mrs. Dr. Robbins; Vice-president, Mrs. C. J. Scofield; Secretary, Miss Julia Ferris; Treasurer, Mrs. W. C. Hooker. The society was formed for the purpose of assisting each other in the cultivation of flowers and shrubs. It has been the aim of the society to make our meetings pleasant and instructive in this respect, and I think we have succeeded, for the society has progressed equal to all expectations. For the first year, the culture of flowers, and sending them to the sick, was the only aim of the society.

The second year, Mrs. W. C. Hooker was elected President; Vice-president, Mrs. J. B. Strader; Secretary, Miss Mina Risse; Treasurer, Mrs. Mary Gill. With such an excellent corps of officers

the society rapidly grew in favor, and many more names were added to the roll. In June, 1885, was held our first "Flower Show," which was a perfect success in every way. In addition to the "Flower Show" we had refreshments served, both afternoon and evening, of both days. In the following November was held a "Chrysanthemum Show," which was also a success.

The third year, Mrs. W. C. Hooker was again elected to the Chair; Mrs. W. E. Mason, Vice-president; Mrs. B. F. Peterson, Secretary; Mrs. Mary Gill, Treasurer. Nothing of note occurred durthe year, except the society held regular meetings and were constantly gaining in knowledge of floriculture.

In August, 1886, Mrs. Dr. Noyes was made President; Vice-president, Mrs. Dr. Robbins; Secretary, Mrs. B. F. Peterson; Treasurer, Mrs. O. F. Berry. The society has made a handsome display each year, at our county Fair, and has taken special pains to make the Floral Hall attractive. In February, 1886, the Guild gave an "Old Folk's Concert," for the benefit of the poor, which was turned into the relief fund of our city. The receipts were $37.15.

In 1886 we commenced sending, or rather furnishing, flowers to all funerals, no one being missed, if possible, and the poorest given special attention.

In this, our mission, it is to be hoped we have done some good. We have seen the widow's face brighten, and the mother smile through her tears, and received the grateful thanks of many sorrowing ones when presented with an offering made from our choicest flowers. The sweet flowers! They cheer us when nothing else will. Bright gems of earth, which make us think what Eden was, what Heaven may be.

In June, 1887, we held a second "Flower Show." A number of displays in cut flowers were made by the Guild, as well as by ladies outside of the society. The "Flower Show" was again a success and netted the sum of $33.53.

In August, 1887, Mrs. Duane Pennock was elected President; Mrs. W. R. Hamilton, Vice-president; Mrs. Elizabeth Cherrill, Corresponding Secretary; Mrs. Frank McMechan, Recording Secretary; Mrs. J. M. Browning, Treasurer.

We have derived much pleasure in our meeting together, and the members of the society have become endeared to each other by the strongest ties of friendship. From its first organization, the society has been the most successful. Its founders were ladies of the highest culture and refinement, and the society has been very fortunate in electing such able officers. Much credit is due them for the ability and faithfulness with which they have performed their work. We feel that much good has been done by our society, and that much more can be accomplished. In a word, we are proud of our Floral Society, and hope we will encourage others to form themselves into societies for the purpose of improving in the care and culture of flowers.

## THE DECLINE OF ORCHARDS IN ILLINOIS.

BY DANIEL SHANK, CLAYTON.

Seeing my name on the programme for an essay on "The Decline of Orchards in Illinois," I respond briefly, knowing that many of the causes, herein mentioned, have often been brought up for your careful consideration, while other thoughts may be out of the general line.

Having had twenty years of experience in fruit growing and six years in the nursery, I am fully satisfied that continued reproduction by grafting from grafted stock has no effect whatever in weakening the vitality of the species.

This we find demonstrated in the fact that each individual variety of apple has its own peculiar characteristic. If we take a Ben Davis apple and place it on the French crab if you please, and on ever so small a piece of root you will find 90 per cent. of the trees with only lateral or brace roots, regardless of how many times they have have been propagated; while you may take the Rambo, all else being equal, 50 per cent. of them incline to tap roots. And the same may be said of Maiden's Blush. *Vice versa* the Jonathan. Each variety always retains its own individuality in forming roots, stem and branches.

Now, you may use the same varieties on whole roots, and the result will be the same, and the tree will bring out its own characteristics, regardless of how many times it has been re-propagated. Hence I think we find no natural causes for decline in this direction. The common causes, such as blight, mildew, borers, etc., all contribute largely to the destruction of our orchards. Also do the extremes of seasons play a very important part in the decline of orchards, and especially the winter season. Many of our trees are killed by the alternate freezing and thawing of the south and southwest sides of the trees. Take it in mid-winter, where the trunk of the tree becomes warm, and the sap is excited to action, the sudden lowering of the temperature at night causes the sap to freeze, which expands it one-ninth of its bulk, and thus expands the cells of the liber and cause them to retain a greater portion on the following day, which, on freezing at night, again expands one-ninth its bulk, which now makes two-ninths; and this, continued for several days in succession, will entirely destroy the lacticiferous tubes; and when spring comes you see no outward effect, but as the sap starts on its upward flow, when reaching those ruptured cells it fails to circulate, and, like the broken vessels on your finger cause the blood-blister, so this escaped sap secretes here; and as the weather becomes warmer, this confined sap begins to ferment, and causes blood-poison to the tree, and the strong odor arising from this fermented sap serves to

invite the body-borers, which soon make their appearance, and the tree is crippled for life.

This can be done by heading low and inclining the tree to the southwest, so the branches may serve to shield it from the sun's rays.

Then, again, to my mind, one of the worst drawbacks to our orchards is, that they are planted too far apart, especially from north to south. Nineteen years ago I planted out twenty apple trees. I set 24 x 24 feet and my neighbors laughed at me for setting them so close. Six years after I wished to enlarge my orchard, and not wishing to break my rows the long way, that is, from north to south, I planted the next two hundred twenty-four feet, east and west, by thirty feet north and south. Now, the result was that my 24 x 24 feet grew up, and soon shaded the ground. They commenced to bear at six years after planting, and have done well, while those 24 x 30 feet have have not done half so well. I find the trees thirty feet north and south are just right to let the heat of the sun pass over one tree and shine on the roots of the next, and cause the ground to become very hot, giving back a reflex heat, and in dry weather sufficient to kill all vegetation on the south side of the trees. Now, if those trees were near enough to each other, so one could shade the roots of the other, and also protect the bodies from the hot sun of summer and the extremes of winter, I am quite sure it would be much better. Then, again, the warm sunshine directly under the trees in the early spring, causes the earth to warm up and starts the sap to flowing, which exposes the tree to the sudden freezes incident to early spring, whereas, if the trees shaded the ground entirely, they would retain the frost much longer and thus retard the flow of sap. Hence, in my judgment, we should plant our apple trees from sixteen to twenty feet north and south, by twenty to thirty feet east and west — the kind of soil and variety must govern to some extent.

Then, again, another thing tending to the decline of orchards is the indiscriminate planting of varieties, regardless of their susceptibility to disease. For instance, why do we plant a thin, small leafed variety when we expect mildew and rust, whose first attacks will destroy the foliage of the trees? Why plant such kinds as we know are subject to blight, when there are many kinds that are not? Why plant tall growing kinds, or train low growing kinds tall when we may expect high winds? Why plant kinds without foliage when blooming, when there are many that send out plenty of foliage with bloom to protect it from spring frost? We should remember that thin, small leaves indicate thin bark, while thick, large leaves show thick, strong bark.

So, in conclusion let me say, we should use as much judgment in our orchard growing as we would in our stock breeding, or field cultivation. When we learn to follow the dictations of nature we

will not need to say every one to his neighbor, How shall I prevent the decline of my orchard ?

The following paper was read at the meeting, but the copy was not received until too late to insert in proper place:

## LABOR.

BY MRS. GEO. J. ROGERS, WARSAW.

My subject, in these exciting times of anarchy and abuse of free speech, is rather broad and weighty for one to select on such an occasion, and no one could, in so short a time, be he ever so ready with the pen, do justice to a subject on which so much has been written. Therefore, we will leave Herr Most and George Francis Train to take care of themselves and those whom they have incited to rebellion, and Master Workman Powderly to look after the interests of the laboring man, and speak only of the labor of the horticulturist versus the labor of the housewife, or head of the family. The word horticulturist is from the Latin *hortus*, a garden, and *cultura*, cultivation. The dictionary defines a horticulturist as one who is versed in the cultivation of kitchen gardens and orchards. The definition of the word housewife is a female economist, or a frugal, careful and thrifty woman. You will notice then not only a similarity in the words, but also in their meaning. While one studies and experiments in the hope of raising the finest specimens in orchard or garden, the other must carefully study and experiment to care for the products of these and prepare them for the market and for the best use of them in the family. And I assert that the preparation of fruit, canning, preserving, etc., is equally as arduous as rearing the same. I believe the gardener's busy season begins with the month of March with the preparation of the soil for the growth of vegetables and the pruning and mulching of fruit-bearing trees and vines. So very nearly as early does this blustering month bring extra work to the housewife. For with the advent of our first strawberry in June, if a favorable season, she will have no rest until the last pear, grape and apple has been cared for and housed for the winter — this, the season of rest for the horticulturist, but not so for the housewife. In noting the similarity in the labor of the two we have not lost sight of the truth of the old adage, that

> "Man's work is from sun to sun,
> But a woman's work is never done."

And her season of rest comes only with the shades of night, and "Nature's sweet restorer, balmy sleep." "When the cares that infest the day have folded their tents, like the Arab and as silently stolen away." And here I would like to call your attention to the fact, without at all questioning the generosity of the sterner sex, that

the statistics of the Patent Office show only one invention in every twenty for the lightening of woman's work. This may be due partly to the lack of inventive genius on the part of woman herself, for we are told by the same statistics, that there are twenty male inventors to one female, notwithstanding the fact that woman has always had the credit of possessing largely a certain kind of inventive genius. Or may it not be because of her gentle and uncomplaining disposition, that she so willingly performs the routine of every-day-life, with only the sewing machine, washer, and churn, as the products of the brain to aid her. And these are to be found only in the homes of the thrifty, while the horticulturist and agriculturist have their machines for every department of work. But fear not, busy housewife, for in this progressive and inventive age, we opine it will not be long ere the family ironing, bread making, and pastry cooking will be done by machinery, with electricity for the motive power instead of human strength and muscle. And now, while the inventor's art has done so much to lighten the labor of the horticulturist, science and research have done much more toward enabling him to grow the products of the soil to perfection, and he would be lost indeed without his *Scientific American* or *Agricultural Journal.* And while the farmer and fruit-grower anxiously looks for, and is benefited by the perusal of these papers, the good wife as anxiously looks for the suggestions to be found in the *Home Journal, Floral Cabinet, Household*, and other equally as good periodicals, and profits by the by the hints to be found in them on "home adornment," the culinary art, the all-absorbing matter of dress with the least expense, and, in fact, everything pertaining to the family.

What halcyon days then, *in this respect*, are these for the horticulturist and the housewife. When we remember that fifty years ago such a thing as a paper devoted to *farming alone* was not known, and when the housewife was quite content with the advent into her home, twelve times a year, of *Godey's Lady's Book*, or *Peterson's Magazine*, with little to interest or instruct aside from the weak, washy love stories they contained. And to my sisters of leisure and fortune, who live a life of ease and idleness, if any there be present, they know not the peaceful content enjoyed by the thrifty housewife, after the day's toil, when she lies down to rest with the consciousness of having passed a well-spent day in laboring for those she loves. And, if seeking for happiness you will find it in the homes of the industrious and contented, and *not* in the homes of the indolent and aimless.

The Roman catechism made sloth one of the seven mortal sins, and Goethe said "that more harm was done by laziness than by actual sin."

There is no need of any one living an aimless life, for the field is wide, and in the words of the poet, —

Do not then stand idly waiting
  For some great work to do;
Fortune is a lazy goddess,
  She will never come to you.
Go and toil in *any* vineyard,
  Do not fear to do or dare;
If you want a field of labor,
  You can find it anywhere.

Now, while it is the duty of one, while striving to rear the finest specimens in orchard or garden, to embellish his farm and surroundings with beautiful trees, well kept lawns, fine fences and outbuildings; it is also the duty of the other to embellish home in every way, according to her means. And this home adornment, we are thankful, is within the reach of all. A few bright pictures, a window filled with growing plants, well cared for, and a few bright ribbons looped with the touch that only a woman's hand can give, with books and a cheery wood fire, are home adornments to be found in the cot of the lowly, as well as in the mansions of the rich.

But I trespass on the subject allotted to my sisters, and so ably discussed by them on last evening.

It has been said that Faith, Hope and Labor are the levers of progress. Let us, then, labor on the farm and in the home, striving to attain the perfection in all things, cheerfully and willingly, with Faith and Hope shining brightly as a beacon, and success will crown our efforts; and when we shall lay down the burden of life we shall be prepared to receive the welcome plaudit, "Well done, good and faithful servant; thou hast been faithful over a few things—I will will make thee ruler over many."

# MEETINGS OF THE EXECUTIVE BOARD

OF THE

# ILLINOIS STATE HORTICULTURAL SOCIETY.

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## DECEMBER MEETING.

PRINCETON, December 13th, 1887.

The Executive Board convened at the American House at 9 P. M. Present: President Riehl, Secretary Hammond, J. S. Browne, T. E. Goodrich, C. N. Dennis, D. H. Gray, and Len. Small.

On motion it was ordered that the question of publishing the next volume of transactions be taken up for consideration.

The Secretary read the bid of Franks & Sons, proposing to print fifteen hundred volumes at the same price as last year, which, on motion, was accepted.

Mr. Small moved that the Secretary be instructed to keep the book within the limit of 400 pages. Motion adopted.

On motion, C. N. Dennis, J. S. Browne and Len. Small were appointed a Committee on the Secretary's and Treasurer's Reports.

J. S. Browne presented a bill for ad interim work of $26.70, which, on motion was allowed and an order drawn for the amount.

PRINCETON, December 14, 1887.

The Board met at the call of the President.

Present, the same members as yesterday, with the addition of Mr. Scott. A full board.

The President stated that he had been informed that there were certain articles on exhibition that from their appearance did not seem to have been grown by the exhibitor, and that he desired the Board to take such action as they thought best.

Mr. Dennis said that the party referred to called his attention to the fact of having manured his trees, which had given good results, and moved that the fruit and other articles be allowed to compete, and the party required to make an affidavit that he had grown or manufactured them. The premiums to be withheld until the affidavit is made. Motion adopted.

The Committee on Secretary's and Treasurer's Report reported that they found them correct.

Mr. Dennis moved that a committee be appointed to examine the exhibit of Mr. Webster and report what amount he would have received if it had been properly entered. Motion adopted.

The following bills were allowed and the President and Secretary ordered to draw warrants for their payment as well as for premiums awarded:

| | |
|---|---|
| E. A. Riehl, expense of board meeting | $ 27.35 |
| J. S. Browne, expense of board meeting | 27.15 |
| T. E. Goodrich, expense of board meeting | 20.51 |
| H. K. Vickroy, commission | 47.72 |
| A. C. Hammond, expense of board meeting and cash advanced | 23.61 |
| A. C. Hammond, salary and expense of Secretary's office | 195.63 |
| Chas. Patterson, expense bill | 14.75 |
| Bessie M. Nash, reporting | 20.00 |
| A. C. Hammond, premium and cash advanced | 53.00 |
| D. H. Gray, expense of board meeting | 4.68 |
| C. N. Dennis, expense of board meeting | 12.09 |
| Len. Small, expense of board meeting | 14.55 |
| J. T. Johnson, reporting | 20.00 |

On motion of Mr. Goodrich it was ordered that the Secretary be allowed $50.00 for extra office help the ensuing year.

On motion, the Secretary was directed to go or send a competent person to Peoria to read proof.

On motion, a special premium of $8.00 was awarded J. Webster and $3.00 to S. F. Connor, and orders drawn for their payment.

It was moved and carried that a special board meeting be held in Springfield, January 5th, 1888.

E. A. RIEHL, *President.*

A. C. HAMMOND, *Secretary.*

## JANUARY MEETING.

SPRINGFIELD, Jan. 5th, 1888.

The Executive Board of the State Horticultural Society convened in the Revere House, at ten o'clock A. M. Present, Milo Barnard, C. N. Dennis, D. H. Gray, E. A. Reihl, J. S. Browne and A. C. Hammond.

The Secretary stated that a box of reports (last volume) that should have gone into the hands of the Legislature, was in the office of the State Board of Agriculture, subject to our order.

On motion, it was ordered that Secretary Mills be instructed to distribute them among the farmers and fruit-growers of the State, as he may think best.

Mr. Dennis remarked that there are about sixty counties in the State that are seldom or never represented in our meetings, and, therefore, know nothing of our work, and moved that the Secretary be instructed to send 200 copies of the forthcoming report, as well as such copies of back volumes as can be spared to farmers and horticulturists in these counties. Carried.

Mr. Riehl moved that the President appoint a committee of one, from each of the three districts of the State, to confer with Prof. Burrill in relation to experimental work. Carried.

On motion, it was ordered that the various local societies be requested to send to the Secretary a report — not to exceed ten pages — of their proceedings for publication.

On motion, it was decided to suggest to the State Board of Agriculture the propriety of employing experts to award the premiums in the various horticultural departments of the State Fair. Also, of making an iron-clad rule that all horticultural products must be grown by the exhibitor, or else to remove all restrictions.

Mr. Riehl moved that we recommend to the Governor that when he, by proclamation, names the date for "Arbor Day," it be as near the middle of April as practicable. Carried.

On motion, it was ordered that the instructions of last year, in regard to volunteered papers, be continued.

Mr. Dennis moved that the President and Secretary be authorized to approve the bond of the Treasurer, and draw warrant on the auditor of public accounts for the annual appropriation. Carried.

Mr. Riehl moved that we offer premiums to the amount of $300 for an exhibition of horticultural products at the next winter meeting. Carried.

Mr. Browne moved that we proceed to revise the premium list. Carried. (See Premium List.)

On motion, it was ordered that the first rule of exhibition be so amended as to read, "All entries must reach the Secretary on or before the Saturday preceding the meeting," and that the words, "except No. 38, upon which no restriction is placed," in the second rule, be stricken out.

On motion, Special Rules 6 and 7 were adopted. (See Special Rules.)

Mr. Brown moved that competition at the annual meeting be limited to the State, except Nos. 7 and 8, which shall be open to the world. Carried.

Mr. Riehl moved that we require all exhibits to be plainly and conspicuously labeled with the name of the fruit, and owner, and place of growth. Carried.

On motion, it was ordered that the Awarding Committees shall consist of one man each, who shall be an expert.

On motion of Mr. Gray, the appointment of Standing Committees was now taken up. (See List of Standing Committees.)

On motion, it was decided to make the first evening of the meeting "Young People's Session," and invite a number of young ladies and gentlemen to take part in it.

On motion of Mr. Browne, the usual appropriation of $50 was continued to the three district societies.

On motion, J. S. Browne was appointed Superintendent of Exhibition, at the Alton meeting.

On motion, the order of last year in relation to ad-interim work was re-enacted, but the expenditure confined to $40 in each district.

The following bills were allowed, and warrants drawn for their payment:

| | |
|---|---|
| D. H. Gray, expense of board meeting | $13.57 |
| J. S. Browne, expense of board meeting | 9.50 |
| C. N. Dennis, expense of board meeting | 11.83 |
| Milo Barnard, expense of board Meeting | 13.80 |
| E. A. Riehl, expense of board meeting | 11.35 |
| A. C. Hammond, expense of board meeting and cash advanced | 14.55 |

Adjourned to meet at the call of the President.

MILO BARNARD, *President.*

A. C. HAMMOND, *Secretary.*

*Transactions of the . . . .*

# FOURTEENTH ANNUAL MEETING

OF THE

# HORTICULTURAL SOCIETY OF CENTRAL ILLINOIS,

HELD IN

ELMWOOD, AUGUST 3D AND 4TH, 1887.

*Reported by A. C. Hammond, Secretary,*

## CONSTITUTION.

ARTICLE 1. This Association shall be known as the Horticultural Society of Central Illinois, and shall embrace the counties of Adams, Brown, Cass, Champaign, Christian, Coles, De Witt, Douglas, Edgar, Fulton, Ford, Iroquois, Hancock, Henderson, Knox, Logan, Livingston, McLean, McDonough, Mason, Marshall, Mercer, Menard, Morgan, Macon, Moultrie, Peoria, Pike, Piatt, Sangamon, Shelby, Schuyler, Scott, Stark, Tazewell, Vermilion, Warren and Woodford,

ART. 2. Its object shall be the advancement of the Science of Pomology and the Art of Horticulture.

ART. 3. The membership of the Society shall consist of members of all local Horticultural Societies in the district who have paid their annual fee, and of all other persons interested in horticulture, on the payment of an annual fee of one dollar, the wives and daughters of members, who shall be members without fee, and such honorary members as the Society may elect.

ART. 4. Its officers shall consist of a President, three Vice-Presidents, a Secretary, Assistant Secretary, Treasurer and Executive Committee, which shall consist of the President, Vice-Presidents and Secretary, and shall hold their offices for one year, or until their successors are elected.

ART. 5. The Vice-President first elected shall be a member of the Executive Board of the State Horticultural Society.

ART. 6. This constitution may be amended at any regular meeting by a two-thirds vote of the members present.

## BY-LAWS.

1. The President shall preside at all meetings of the Society, call meetings of the Executive Committee, and, under its direction, have a general superintendence of the affairs of the Society, and direction of the expenditures of its money; he shall deliver an annual address upon some subject connected with horticulture, and shall appoint all committees, unless otherwise ordered.

2. The Vice-Presidents, in the order of their appointment, shall act in case of the absence or disability of the President, and shall, by correspondence and personal intercourse with the horticulturists of their several localities, endeavor to organize local societies, obtain accurate information of the condition and progress of horticulture therein, and report annually, in writing, to the Society.

3. The Secretary shall record the proceedings of the Society, attend to its correspondence and prepare its reports for publication.

4. The Assistant Secretary shall assist the Secretary to record and prepare for publication the proceedings, and in his absence discharge the duties of his office.

5. The Treasurer shall receive and keep an accurate account of all moneys belonging to the Society, and disburse the same upon the written orders of the President and Secretary, which he shall retain and file as vouchers; he shall make an annual report to the Society of the receipts and disbursements, which, with the vouchers, shall be referred to the Executive Committee for settlement. Before entering upon his duties he shall give a bond in the sum of two hundred dollars for their faithful performance, such bond to be approved by the Executive Committee.

6. The Executive Committee shall, subject to the direction of the Society, manage all its affairs.

7. The By-Laws may be altered at any meeting by a majority vote of the members present.

## OFFICERS FOR 1888.

*President*—C. N. Dennis, Hamilton.
*First Vice-President*—D. H. Gray, Elmwood.
*Second Vice-President*—A. L. Hay, Jacksonville.
*Third Vice-President*—Prof. T. J. Burrill, Champaign.
*Secretary*—A. C. Hammond, Warsaw.
*Assistant Secretary*—Miss Bessie Nash, Warsaw.
*Treasurer*—Dr. Lyman Hall, Champaign.

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*Next Annual Meeting at Champaign, August 1st and 2nd.*

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## LIST OF MEMBERS FOR 1888.

Blanchard, Dr. Joseph.....Elmwood.
Bowers, C. L.....Elmwood.
Brain, J. T.....Elmwood.
Brown, E. R.....Elmwood.
Buckley, C. A.....Knoxville.
Burrill, T. J.....Champaign.
Burt, H. O.....Brimfield.
Chapin, Wm. E.....La Salle.
Davison, James.....Elmwood.
Dennis, C. N.....Hamilton.
Dimock, A. M.....Elmwood.
Dunlap, H. M.....Savoy.
Ewalt, G. M. D.....Elmwood.
Ford, L. D.....Elmwood.
Gray, D. H.....Elmwood.
Hall, Dr. Lyman.....Champaign.
Hammond, A. C.....Warsaw.
Harkness, C. W.....Elmwood.
Harkness. Edwin.....Elmwood.
Humphreys, W. J.....Elmwood.
Humphrey, A. G.....Galesburg.
Hurff, I.....Elmwood.
Jarman, J.....Elmwood.
Lobaugh, J. J.....Elmwood.
Nash, Bessie M.....Warsaw.
Spring, J. H.....Elmwood.
Phelps, Samuel.....Elmwood.

HONORARY MEMBERS.

Bryant, L. R.....Princeton.
Connable, Mrs. A. E.....Hamilton.
Meade, Mrs. R. H.....Galva.
Parr, Prof. S. W.....Jacksonville.
Rolfe, C. W.....Champaign.
Weed, C. M.....Champaign.

*Proceedings of the....*

# FOURTEENTH ANNUAL MEETING

OF THE

# Horticultural Society of Central Illinois.

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## WEDNESDAY A. M., AUG. 3.

The Fourteenth Annual Meeting of the Horticultural Society of Central Illinois, convened in Liberty Hall, in the city of Elmwood.

The President, Prof. T. J. Burrill, called the meeting to order, and asked Rev. G. W. Minier to offer prayer.

President Burrill—Mr. E. R. Brown will now offer a few words of welcome to the Society.

### ADDRESS OF WELCOME.

BY E. R. BROWN, ELMWOOD.

When you stepped off the train this morning, at the brakeman's announcement of "Ellumwood," doubtless you looked about and wondered where this same "Ellumwood" might be. Well, the brakeman was right; the town is here, or hereabouts, under the elms and maples, and over behind the hedges—a village of a couple of thousands, spread out very wide, and, consequently, very thin. Our city is not as old as Damascus, but is well past sweet sixteen; and the sinuous Kickapoo, on whose head-waters (head-dust at present) it is located, is older, if we may believe the geologists, than the Nile or the Euphrates. We have no feverish Wichita boom to show you; no cataract or roaring waterfall. But Elmwood has a mountain of her own, that rises toward the zenith, ninety feet above the level of the Kickapoo—in a dry time. By and by we will take you up into that mountain and show you, from its summit, a kingdom without a king; such a glorious lay-out of field and farm as any monarch on earth might sell his kingship to buy.

And now I will tell you why we invited you to come "over the garden wall," so to speak, into our rural City of the Elms, and why you will be heartily welcomed here. It is because we wish to enlarge our field of vision and of interest, and to open up among our own citizens new avenues of pure, innocent and profitable enjoyment of life. An unhappy horticulturist ought to be as rare as an undevout astronomer. To the true horticulturist every field or garden is a Delectable Land. There he whispers to the swelling tubers, flirts with the birds, hob-nobs with beetles, and stands sponsor at the courtship and marriage of strawberry blossoms.

Now, here is Brother Gray, the President of our local society, give him a jack-knife and a ball of twine, and turn him loose among berry bushes, morning-glories and beetles, and his felicity is assured. But to most of us the rich and delightful book of nature is still a sealed volume; the pleasures of its study are hardly dreamed of. For myself, I confess, with all humility, that I know little more of the works and ways of the plants that nod at me by the wayside, or over the garden fence, than I do of the private life of a lightning-bug or a hippopotamus. Sometimes, indeed, I get a ravishing glimpse of the promised land of science, but, like Moses of old, a glimpse is all I can hope for, for I am one of those old-fashioned candles mentioned by O. W. Holmes as being "low in the tallow and long in the wick," and soon to be snuffed out. But you who range those fields of natural science will help us to see and enjoy what we otherwise could not,—at least that is the kind of people we take you to be. I walk abroad at night with certain good men, whom I greatly respect for their wisdom, but though our conversation is of the Milky Way and the constellations, my mind stumbles and flounders in miry places of the earth; but I saunter with others in lowly places, and, though our talk be only of radishes and earth-worms, we seem to walk with Orion among the stars. Why this difference? Is it not because these latter make their report of nature at first hand, from personal and loving acquaintance, and so seem to be at one with the universe? I envy the man who is on speaking terms with roots, flowers, berries and bugs. I want to be reckoned an honorary member of his society, by whatever name he may call it. Emerson said of Thoreau that "he told the bees things, or the bees told him." Now we have invited you and welcome you, because we think you are people of this sort. You are either "well up" in horticultural lore or you are enthusiastic learners, and I am not sure that I do not enjoy the learners best. We welcome you because you bring from nature's open laboratories, from your teachers, the woods, skies and orderly seasons, messages to soften the clink of silver; you bring the rustle of green leaves to replace, for the time, the rustle of dry goods and the meaningless clatter of tongues.

Bryant says of Truth, that

"The eternal years of God are her's."

With equal accuracy we may say of the plant that the ways of the eternal God are her's.

He who knows the habit of a plant to that extent has learned the ways of the Eternal. What an opulent and glorious time is this in which we meet! What a grand century in which to live, labor and learn. Though horticulture is almost as old as mankind, it is only in recent years that science has been invited to a full partnership in the business. Even geology, whose venerable records illustrate uncounted ages, is, as a science, only three score and ten years of age.

The crowning glory of this happy century is the devotion of cultivated men to natural science. With each new revelation the thoughts of men are widened, hope for the race is strengthened and charity enlarged. We congratulate you on these happy omens of progress, and we expect, through your presence and labors here, to enlarge the horizon of our knowledge and heighten our interest in world lying all about us. Some among you who stand near to Nature's heart may guess for us the secret by which she transmutes offal, garbage and noisome decay into cucumbers, marigolds and red-cheeked apples. At the least, you will strengthen our faith that some mighty alchemy, analogous to that which brings fair fruits and flavors, and sunset tints from filth and foulness, will yet produce from the beggarly elements of civilization in cities and villages, heroism, beauty, and clean and wholesome lives. For, after all, the great purpose of horticulture is, or should be, homo-culture, — the culture of men.

Welcome, ladies and gentlemen, one and all, thrice welcome to our rural City of the Elms.

## RESPONSE BY THE PRESIDENT.

President T. J. Burrill responded in the following appropriate manner:

I return, in the name of our Society, very hearty thanks for this cordial welcome to Elmwood. Mr. Brown seems to be wonderfully apt and excellently fitted for writing and presenting such an address. All must acknowledge that the task has been done, not only appropriately but with much vivacity and eloquence, as well as with good judgment and taste. I congratulate the citizens of the place and the members of the local Society that one so well qualified to speak for them was found and appointed to the pleasant duty. One may, however, be inspired by his theme, and recognizing, as I do, that there is much to speak for and about, a partial explanation is reached for the aptly chosen words and pleasantly arrayed thoughts.

Up betimes this morning, in company with another one of your guests to-day, I left the hotel at an early hour and took a ramble

about the town. So some acquaintance had already been made with special points, noted so felicitously by Mr. Brown, giving character to the place. Your favorable and beautiful location, your wide streets and wider stretches of commons and cultivated fields, passed by the sidewalks to the dwellings beyond, your room for future greatness in houses and inhabitants, your thrifty business quarters and tasteful homes, speaking at once of enterprise and domestic enjoyment, of prosperity and contentment,— these were seen in the glowing coloring of the early sun. I had even found your placid little lake, with its one boat, not quite tempting a trial at inland navigation, the picturesque ice-house near by, and on, still further, the beautiful cemetery, evidently laid out with an idea of populations that have not arrived in great numbers. As in the town, there is here room for many others to fill the measure of the founders.

I could not be otherwise than much pleased with Elmwood. Gladly would I emulate the eloquent words of the address of welcome, in speaking the praises which are acknowledged but not formulated in fitting words. Still, I may be permitted to give utterance to an appreciation of the wealth and worth of the land in which we live, in the way of natural advantages and resources. The great valley of the Mississippi is the fairest and richest portion, size for size, of the earth. Nowhere else is there found so many elements which, combined together, make fertile soils, favorable skies, temperate air, richness, luxuriance, power. Here, if anywhere, man may find congenial living and phenomenal prosperity. Here, if anywhere, he ought to grow in stature and wisdom, in greatness and goodness. And Illinois is the garden-spot of the wondrous valley. We, by nativity or adoption, may justly take great pride in our magnificent commonwealth. In all that constitutes the physical basis of a state Illinois stands proudly prominent among her sisters. Her wondrous prairies were tilled in crops yielding the largest returns for the smallest expenditures of labor; her broad, level expanse cut into a network by railroads; her majestic rivers, capable of bearing the freightage of the nation; her inexhaustable supply of coal; her vegetable luxuriance and abundant animal life — these are but items in the natural and acquired prominence of Illinois and her material wealth.

Now, Elmwood is in the heart and center of Illinois. Neighboring towns share the good fortunes of this, but claim richer surroundings or greater advantages for prosperous business and happy lives. So far as these things can make contentment; so far as wealth has to do with happiness; so far as favorable circumstances and helpful surroundings make true manhood and womanhood, this and neighboring communities should be conspicuous in the high character of the people. Our art mends nature. We strive to add something of worth to ourselves, to the rich inheritance we have re-

ceived. We want to profit as mental and moral beings, by the studies which bring us together. As has been just said to us, our business brings us into intimate relations with the interesting and instructive facts and forces of Nature. The nearer we make these associations, the better for us as specialists, and the more hope for us as social, intellectual, moral and religious architects of our own fortunes. The more clearly and fully we recognize the truths written upon leaves, and the better we appreciate the teachings of flowers, the more we shall think of ourselves and of the great Author of all. Tennyson puts it in this wise:

> "Flower in the crannied wall,
> I pluck you out of the crannies—
> Hold you here, root and all, in my hand.
> Little flower! but if I could understand
> What you are, root and all, and all in all,
> I should know what God and man is."

Again I return the thanks due from our Society for the elegant welcome received; and with this encouraging beginning we will hopefully pursue the order of the program.

## SECRETARY'S REPORT.

BY A. C. HAMMOND, WARSAW.

*Mr. President, and Fellow Members:*

The revolving year has brought us to another mile-stone in our history, and as the careful business-man annually takes an inventory of his stock, and examines the ground over which he has passed, so it becomes the Horticultural Society of Central Illinois, to examine its past work, that it may know whether it is of the character that benefits the citizens of the State, and blesses the world at large. In brief, whether this society deserves to live, and receive the fostering care of the good people of the best portion of the grandest agricultural and horticultural State in the Union.

We point with pride to the record of our last three meetings—which may be found in the transactions of the State Horticultural Society—and think it compares favorably with other portions of that valuable report.

The last meeting was one of special interest, and the attendance probably the largest ever present at a meeting of the kind in the State, and we confidently expect that this occasion will be even more interesting, and hope the attendance will be as large as at Hamilton.

There are special reasons why we expect much of the horticulturists of Peoria County, and anticipate a meeting of great interest. When the horticultural history of the State shall be written, it will be shown that here was planted one of the first nurseries and orchards in the State, and that here was the birth-place of the Illinois State Horticultural Society.

About 1835, Edson Harkness settled in Trivoli, a few miles miles south of this place, and a few years later, established a nursery and planted an orchard. At that early day we find him experimenting with, and advocating the Osage Orange as a hedge plant, and in the columns of the agricultural press urging the importance of industrial education. With a prophet's ken he saw the possibilities of this wonderful land, and the importance of an organization of fruit-growers and nurserymen to foster the young industry.

His first attempt, in 1845, seems to have failed, but in 1846 his efforts were crowned with success, and a meeting was held in Peoria, October 15th, of that year. This was the first horticultural meeting held in the West of which we have any record. From the seed here sown sprung the Illinois State Horticultural Society, and Mr. Harkness may justly be claimed as its father, and Peoria County as the birth-place of that organization.

The old *Monthly Prairie Farmer* preserves an address made by him at that meeting, in which he seemed to look down the vista of forty years, and see this God-given prairie state as we see it to-day. His concluding remarks were so prophetic that I quote them: "In my day dreams I have seen wide avenues stretching away in the distance, enclosed on either side with banners of living green. Along the borders of these avenues, neat farm houses and cottages, the abode of an industrious, intelligent and happy people — every dwelling surrounded with beautiful trees, shrubs and vines. In the background, stately orchards, all gleaming with delicious fruits; well-cultivated fields, rich meadows and pastures, dotted over with fat, contented flocks and herds." If this noble man — long since gone to that "better land" where the tree of life ever blooms beside the fair river of paradise — is permitted to stand in the portals of Heaven and look down on the scenes of his earthly life, how great must be his astonishment to see the literal fulfillment of his waking vision!

In the November number of the *Prairie Farmer*, 1847, is an account of a meeting held in Farmington, Fulton county, on the 13th of October of that year, which is called the Annual Meeting of the Illinois Horticultural Society.

Thus we see that Peoria county is rich in historical associations and horticultural reminiscences; and as we look abroad upon its pleasant rural homes, with their background of fruitful fields, and surrounded with orchards and gardens, and beautiful trees and flowers, we behold the harvest that sprung from the seed thus sown in faith half a century ago. Let us cheerfully, yea, gladly, take up the work our fathers have left us, and when the hour-glass of time shall indicate that another half-century has passed into eternity, and this "goodly heritage" becomes ten-fold more beautiful than to-day, our children's children will "rise up and call us blessed."

But what of the outlook? Is the condition of our orchards, berry plantations and fruit gardens satisfactory, and is all going

well with the horticulturist? Candor compels us to admit that such is not the case. Our fruit trees that survived the terrible ordeal of the late cold winters, are bare of fruit; our berry plantations have not paid expenses, and our fruit gardens have failed to furnish the expected supply.

The season has been phenomenal, and the meteorological conditions that have caused the wheat and corn crop of many portions of Central Illinois to be one of the best ever grown, has made the apple and small-fruit crop almost a failure. But we should not be discouraged by this disaster, and whatever may be our opinion of the commercial side of the question, all will agree that planting orchards, fruit and vegetable gardens for home use, and trees for shade, shelter and ornament, should be increased ten-fold.

I do not wish to be understood as discouraging planting commercial orchards and vineyards and plantations of small fruit, but, on the other hand, believe that now is the favorable time to engage in the work. There is scarcely an orchard in Central Illinois over twelve years of age that will ever again produce a profitable crop of fruit, and unless we replant we shall soon be compelled to depend on importations for our market supply.

The successful horticulturist will hereafter plant less acres, fertilize and cultivate better, and fight insects with greater persistency. Experience has taught that the same amount of money and labor that has heretofore been expended on twenty acres will yield a greater profit if concentrated on five or ten.

These and many other equally important questions, such as the probability of securing regular crops of plums by judiciously intermingling different varieties, the advisability of continuing to plant peach and pear trees, and the adaptation of Russian fruit to our soil and climate, demand and doubtless will receive, our attention.

Years ago scientific men predicted that the perihelion, through which we have just passed, would be accompanied with great atmospheric disturbances — scorching drouths and disastrous floods, unusual degrees of heat and cold, fearful tornadoes and earthquakes, swarms of insects, and great fatality to animal and vegetable life. How fully these predictions have been verified you all know; but now that perihelion has passed, may we not take courage and again plant those delicious fruits that have of late mocked the hopes of the horticulturist, with the confident expectation of growing them in as great abundance and perfection as in the days of yore.

A generation ago the irrepressible Yankee came to Illinois to make on these grand prairies a home for himself and children which should be supplied with all those things that minister to the moral, intellectual and esthetic wants.

Who ever knew these hardy sons of New England to be discouraged by adverse circumstances, or having put "their hand to the plow to look back?" May we not, therefore, conclude that Illinois

will, in the future, as in the past, produce an abundance of luscious, health-giving fruits, and noble, high-minded men and women, whom the world will delight to honor?

Since my last report the following orders have been drawn on the Treasurer:

| | |
|---|---|
| C. M. Weed, expense bill | $ 3.00 |
| T. J. Burrill, postage | 1.40 |
| C. C. Hoppe, expense bill | 1.25 |
| C. N. Dennis, expense bill | 1.50 |
| Bessie M. Nash, salary | 10.00 |
| A. C. Hammond, expenses of Secretary's Office | 12.00 |
| Premiums Awarded | 10.75 |
| Total | $39.90 |

All of which is respectfully submitted.

## TREASURER'S REPORT.

BY C. HOPPE, WARSAW.

*To the President and Members of the*
*Horticultural Society of Central Illinois:*

*Gentlemen:* I herewith submit my annual statement of the financial condition of said Society:

| | | |
|---|---|---|
| 1886. | | |
| June 1. | By cash in hand | $ 4.02 |
| June 1. | By seven membership fees | 7.00 |
| June 8. | By cash received from H. K. Vickroy, State Treasurer | 50.00 |
| | | $61.02 |

CONTRA.

| | | | |
|---|---|---|---|
| June 1. | To cash paid C. M. Weed | $ 3.00 | |
| June 1. | To cash paid T. J. Burrill | 1.40 | |
| June 1. | To cash paid C. C. Hoppe | 1.25 | |
| June 1. | To cash paid C. N. Dennis | 1.50 | |
| June 1. | To cash paid premiums | 10.75 | |
| June 1. | To cash paid Bessie M. Nash | 10.00 | |
| June 1. | To cash paid A. C. Hammond | 12.00 | |
| | | $39.90 | —39.90 |
| | By balance | | $21.12 |

All of which is respectfully submitted.

## THE RELATION OF SOIL ORGANISMS TO THE GERMINATION AND GROWTH OF PLANTS.

BY PROF. S. W. PARR, JACKSONVILLE.

The problem of plant nutrition, and the conditions essential to growth are matters of very great practical importance.

We have arrived at our present state of knowledge of such things by slow and uncertain steps — chiefly the result of hard experience. But in these later days, the scientist has taken the plant into the laboratory and greenhouse and studied it chemically, biologically, bacterially. And the indications are that we are about to step into and possess a new field of information; one that almost startles us with its size and value, because of the possibility of being better able to interpret and apply our hard-earned, and not always well-understood experience.

In the first place, then, for a fuller understanding of what is to follow, let us recall a few facts concerning plant food and nutrition.

The two sources of food supply are the air and soil. In general, we may say that the plant, if we were to burn it, would in that process give up to the air those elements it received from the air as food — while in the ashes would remain those food elements it receives from the soil. Among these latter we have to deal, at present with one only, and that is Nitrogen — an essential element, and without which no plant could live. Moreover, this nitrogen, besides being taken up by the roots can only be utilized by them when in a *nitrate* form, as we find it in such salts as nitre, or calcium, or ammonium nitrate. In other words, the nitrogen, combined as it is in undecayed vegetable, or albuminous matter, or in form of ammonia — no matter how abundant, can in no degree be utilized by the plant as food. Now, the question arises, what is the source of supply of this nitrate form of plant food? Any of these nitrate salts are highly soluble and are being constantly leached out of the soil so that there must be some constantly renewed cource of supply. Theories on this point are numerous. Four-fifths of the atmosphere is pure nitrogen — but not in the plant-food condition. Unquestionably the electrical discharges during thunder-storms serves to oxidize some nitrogen which is thus carried down by the rain within reach of the plant roots.

But this supply is but a minute fraction of the demand; so we are obliged to look elsewhere for the source of our nitrates, without stopping to discuss the numerous theories which have remained — simply theories for lack of possibility of proof. Let us turn at once to a theory which seems about to step into the realm of accepted fact. because of the frequent demonstration it seems to receive.

The theory has been proposed by Schloesing and Muntz, and later by Warrington, of the Rothamstead Farm, England, and is

that the nitrate salts were a product of certain organisms of the soil whose province seemed to be to work over the organic nitrogen of the soil, manures, etc., into a nitrate form, and so in a condition to be utilized by the plant.

The experiments conducted by Prof. Burrill and myself, at the laboratory of the State University, began with an attempt to isolate the numerous organisms of the soil, and determine, if possible, which kind or kinds did this special work of nitrification.

The organisms thus far isolated and tested as to their special function in decomposing organic matter, have thus far performed a very different work from that of nitrification, though a work of no less importance. In the two species so far isolated, they have performed the first step in the process — that of converting the nitrogen of the organic matter on which they feed, into ammonia. This step in the process is a highly essential one, because always the first one. It is not yet determined whether these same organisms go on and carry the process through the nitrous to the final nitric stage, or not. Further experiments are necessary to determine if these or some other forms go on and complete the work of nitrification.

The question may be asked here, if we have ourselves any proof of the nitrifying effect of soil organisms. The experiments of Warrington would seem to be quite conclusive, and have been verified in our own work in a very different, and quite as conclusive a manner, as follows:

A pot of ignited sand, free from all foreign matter was prepared. Some ripe pea-pods, fresh from the garden, procured and washed in a strong solution of corrosive sublimate to destroy all germs. The pods were then opened and the seeds thus quickly conveyed to the sand with the least possible chance of carrying with them any organism. As a further precaution the sand was watered with chlorinated water, which has the property of destroying all organisms, and is at the same time a decided stimulus to germination of seeds.

On the third day the seeds were sprouting vigorously, no organisms being present.

By the fifth day the progress of growth seemed to be feeble, but the chlorinated water having been discontinued, and proper nutriment solution having been supplied, together with a small lump of soil to stock with organisms, the growth of the seeds seemed to revive — the water filtering through the sand was becoming turbid with bacteria. A chemical examination of this drain-water showed the nitrates to be still absent, care having been taken to make up the nutriment solution free from any nitrogen in the form of nitrates.

On the sixth morning the drain-water was densely stocked with organisms of several sorts, as shown by a microscopical mount made at the time. But most interesting of all, we find now a posi-

tive test indicating the presence of nitrites, and also in a less degree that of nitrates.

On the seventh morning both nitrates and nitrites were very abundant, undoubtedly due to the action of the bacteria on the nutriment solution, and these plants grew on in a flourishing manner, having seemingly all the conditions of growth fully satisfied.

In marked contrast to this pot was another started at the same time, under precisely similar conditions as to having it free from organisms; and to maintain it free from contamination it was kept under glass, with ample provision for circulation of air and for supplying nutrient material. The air admitted was passed through tubes filled with cotton, to prevent the entrance of organisms, and the water and nutrient solutions were disinfected by heat before being applied. By this means, all organisms were excluded.

On comparing this experiment with the one just described, we find them seemingly equal through the period of germination, and the first one or two days' growth. On the fifth day a marked difference is noticed, those without organisms being pale and drooping. An effort was made to revive them by adding a supply of nitrates to their food. On the following day, the plants seeming to be in a still worse condition, a liberal supply of organisms was added, but without effect.

In this experiment no nitrates could be detected in the drainage water. This experiment then, seemed certainly to point to the fact that the plant, to grow, must have present these organisms.

As still further bearing on this point, another of the experiments may be here noted.

Some grains of sweet corn were being grown in sand, and watered with a 1-100 per cent. solution of corrosive sublimate; that is one corrosive sublimate to 10,000 of pure water. This served to keep the pot free from germs, without destroying the vitality of the corn. However, the sprouting was feeble, especially as to the development of root, which, after pushing out an eighth of an inch, stopped growing entirely. The plumule continued a little farther and stopped. By the sixth day the conditions had become favorable for the presence of organisms in great number. Simultaneous with their appearance we find numerous fine roots starting, the upward growth of leaves starts vigorously, and nitrates appear in the drainage water. Here, again the organisms seem to play an important part, but whether their presence is needed for anything more than to supply the nitrates, and whether the plant would thrive *with* the nitrates, and *without* the organisms, is still a matter of question.

None of the experiments so far have been conclusive on this point, though the weight of evidence seems to indicate the necessity of the presence of the organisms, either in close proximity to or upon the roots, as feeders to provide for the delicate root filaments the essentials to the life of the plant.

We hope by further experiments to arrive at more definite conclusions on this point.

As to the necessity for the presence of organisms, in order that seeds may germinate, we have quite conclusively proved the contrary. Different seeds, it is true, behave quite differently, but in no instance have we been unable to germinate seeds free from all organisms. With the methods at first used for destroying the organisms, even when applied in an extremely mild form, there was no growth of seeds, and it did seem likely to be true that "no organisms" meant "no germination." For example, seeds of cucumber, radish, and peas were washed in a 1 per cent. solution of corrosive sublimate, and immediately rinsed with pure water and kept free from contact with organisms. They persistently refused to grow. These same kinds refused to grow when watered with a solution containing but 1 of the corrosive sublimate in 20,000 of water, that strength being sufficient to keep out all bacteria. However, under these conditions, some kinds, as corn, would grow. So we could not be sure yet but that our mild disinfectants had also killed the seeds. In the same way, seeds that were allowed to remain forty-eight hours in an atmosphere of 1 part of chlorine gas to 100 parts of air, were entirely out of the notion of growing, corn alone excepted. But, finally, this test was made: A bottle $\frac{1}{3}$ full of pure distilled water was filled, the remaining $\frac{2}{3}$ with chlorine gas, and thoroughly shaken until the water has dissolved about 8–10,000 of its own weight of the gas. This was made further into samples of various strengths, all of which were quite sufficient to prevent the growth of micro-organisms.

Up to a certain limit, that of about 1 to 1,500, all seeds, so far as tested, would germinate with great readiness, being in all cases stimulated rather than retarded by the treatment.

Now, what is the sum of the matter so far?

1st. That seeds are not dependent on the presence of micro-organisms for germination.

2d. That growing plants *are* dependent upon the presence of certain forms of micro-organisms, if not in some immediate and vital connection, then surely as the constant means whereby there is supplied the nitrates for plant food, and without which the plant could not live.

And now that we understand the conditions most favorable to the growth of organisms, we may draw some conclusions as to what method will produce in soils the greatest amount of this chiefest of plant foods — nitrates. The whole matter is very suggestive of practical hints, and will doubtless prove, in time, of real, every-day value. The conditions most favorable to nitrification are, briefly: Heat, about 85°, with a limit of from 55° or 60° to 95° or 100°. The presence of a salifiable base, as calcium or potassium. Moisture is essential: darkness, seemingly; and in the soil, nitrification is most abundant in the first two or three inches.

Some practical points may suggest themselves from this rather technical discussion. The following may call to mind still others. A mulch, if of such a kind as to prevent too great an escape of moisture, would seem to help in supplying some of the conditions. This calls to mind the phenomenon sometimes noticed, that plants grown on the spot where a building has stood, are very luxuriant, though there has been absolutely nothing applied to the soil.

The most natural thought is that, nothing having grown there for some time, the soil has rested. But note that, in addition to the most favorable conditions possible for nitrification, the rains have been prevented from washing away the highly soluble nitrates, thus storing up an abundant supply. It just occurs to me — and I think I see Prof. Burrill sticking a pin here — that some ambitious young chemist might do well to crawl under some farm granary or corn-crib, procure a sample of soil, and make a study of the amount of nitrates he finds.

Now, I am reminded still further of an idea that used to possess the mind of my father, that a few stones, especially flat ones, of some little size, pieces of board, etc., were good things to be placed about the roots of his fruit trees. It may be a hard statement to receive just at this time, but we undoubtedly have often too much moisture in the soil, which carries off by filtration these invaluable nitrates. Is it not possible that some system of artificial top-dressing or covering about the roots, at certain seasons, — some method which would most nearly meet the conditions of producing and preserving the nitrates of the soil, would prove of decided advantage to the fruit-grower.

The care and application of manures ought to receive careful study with reference to this theory. We know that green manures mixed with soil and allowed to rot in small heaps greatly increases its value — just the conditions most favorable for nitrification. The ordinary manure heap, with its too great heat and loss of nitrogen, as ammonia, and by constant leaching, is certainly an expensive waste on far too many farms. Again, you may have noticed, as I can well recall, instances where a liberal coating of manure, applied early in the spring and plowed under deeply, produced no perceptible effect on the growing crop, at least in comparison with a similar treatment in the fall. It is undoubtedly true that manure can not be utilized directly by growing crops, but must be worked over by various ferments. Such work, moreover, can not be accomplished under such conditions as would follow from placing the material deeply below the surface while the ground is cold. Probably for this reason farmers meet with disappointment from turning under green crops in the spring, whereas good results follow from such treatment in the fall. Here may be an explanation of some of the good results from fall plowing. The micro-organisms of the soil are, especially in the spring, only in the warm surface-soil. I recall an

instance where a neighbor, believing implicitly in the doctrine that there is no good without great labor, and also that the greater the labor the greater the good, treated a piece of fall plowing to an additional deep plowing early the following spring.

The result was a disappointment, the crop being in no way better than that on another part of the same field, which received only a spring plowing. There is certainly great advantage in being able to place seeds in the warm surface-soil, such as we have in the case of fall plowing, instead of turning this valuable condition of soil far below the surface. Many farmers advocate shallow spring plowing, and their theory often receives striking verification. I recall the case of a strip of some few rods in width being left without plowing, and the field planted in corn. Spring rains had not beaten the ground, so that it seemed remarkably loose after the winter's freezing — an admirable time to try the experiment. The corn on this strip came up quicker, grew more vigorously, and maintained a decided advance over the rest of the field for half the summer. It would certainly be an advantage if our spring plowing could be done by deeply stirring without turning, and so burying out of reach the very part that is in exactly the right condition for germination and growth of seeds.

But enough has been said to show you something of the importance of the subject, and in so far as the theory explains or corresponds with your own experience you certainly will be safe in adopting and acting upon this new theory, so far as it has been developed. In this latter case, by all means make note of your work and report it to some such body as this, that the doctrine may be established, if good, or what is no less important, be thrown overboard, if bad.

Meanwhile it is hoped that further laboratory experiments will materially add to our knowledge of the subject.

Dr. Humphrey—I am glad that the Professor has given us the other side of this question. I have been a little faithless about this new theory, that all diseases that affected either animal or vegetable life were caused by bacteria. It is a relief to know that they are essential to life, as well as the cause of death. It has been thought that diphtheria is caused by these organisms, but I think they are there because they find something to feed upon, and are the result, rather than the cause of the disease.

Dr. Hall — The paper conflicts with the views of many scientific men, on several points. Bacteria, doubtless, have their use in the economy of nature, but those that are found floating about the stable, are probably the cause of diphtheria, scarlet fever, and other diseases of this nature. Ex-Commissioner of Agriculture Capron,

once made the statement, that he had increased the wealth of the nation millions of dollars, by showing the importance of plowing eighteen inches deep. I have had some experience, and find that deep plowing must be done with judgment. Tender plants will not grow on soil turned up twelve or eighteen inches in depth.

G. W. Minier — I think trench plowing an excellent thing once in about ten years. The first year it is often a disadvantage, but afterward its good effect is very apparent.

C. N. Dennis — Several years ago I prepared a piece of ground for apple seed, by plowing and subsoiling. The next season I planted it, and a portion of the same field that had not been subsoiled, with corn. The subsoiled portion produced much the best crop. The next season I sowed to oats with like result. This was followed with grass, and the subsoiled portion has produced twice as much as the other. I have concluded to never again plant nursery stock without subsoiling.

H. M. Dunlap — I think the speakers should qualify their remarks. The time of year and nature of the soil has much to do with the success of the operation. I knew a clover-field plowed partly in the fall and finished in the spring, the fall-plowed portion produced ten bushels of corn per acre more than the other. I have always found deep plowing in the fall attended with good results.

On motion, the hours of meeting were fixed at 9 A. M., 2 and 8 P. M.

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## WEDNESDAY AFTERNOON.

Promptly at 2 o'clock the President called the House to order, and invited Vice-President Dennis to take the chair, who announced that the first business on the programme was the

### PRESIDENT'S ANNUAL ADDRESS,

BY PROF. T. J. BURRILL, CHAMPAIGN.

Gardens have been known and written of in all ages of the civilized world. None of the historical nations and peoples of antiquity were without them. In the dim centuries of the past the Chinese and their neighbors were in their way expert horticulturists. In the

early biblical histories frequent mention is made of gardens and vineyards. Some how or other, the most of us have been taught that the famous tree of knowledge in the center of Eden was an apple tree, though just why, or upon what authority, it is not easy to say. That "apples of gold in pictures of silver" may mean oranges in a silver fruit-basket — the latter the frame rather than the "picture" — is much more probable.

The Romans certainly were good horticulturists for their time, and to them we owe our name as specialists. They were acquainted with the processes of grafting, and Pliny says that certain individuals among them had rendered their names immortal for the improved kinds of fruits they introduced. But alas! for the immortal names. Neither the fruits nor the names are known to us. The triumphal gala days of old Rome were triumphal flower days, too. Arches were covered with them. The very streets were brilliant and fragrant with roses beneath the tread of the conquering heroes and their soldiers' trophies. Cleopatra covered her floors with flowers in preparation for her memorable reception at the old Roman capital.

These are but hints at the existence of horticultural instincts, tastes and practices in olden times. As men and nations rose from the rude condition of barbarism in all quarters of the inhabitable world, this art that doth mend nature also existed and flourished to a greater or less extent, as though gardening and civilization were in some way mutually joined and conditioned. Horticulturists are known only among civilized people; civilized peoples have always practiced horticultural arts. It cannot be said that they who best succeed in growing cabbages, grapes or geraniums are by that sign in the front rank of enlightenment in general; but as a broad proposition, applicable in a very general sense, we may confidently say that degrees of civilization and prosperous horticulture go hand in hand everywhere and always among the nations of the earth. Successful horticulture requires intelligence and industry, while the practice of the art from the love of it tends to develop the brain and heart of the worker. His eyes are quickened for observation, his judgment exercised by careful comparison and classification, and his ethical nature strengthened and refined by contact with the beautiful and the unsullied purity of the living forms which he cherishes as precious gifts from realms where sin and sorrow never come. Horticulture both demands and begets intelligence and law-abiding, peace-loving, hope-inspiring habits of life.

But notwithstanding the foregoing, horticulture, as at present understood, is a modern art. Except professional gardeners (mostly florists) and viticulturists there never were horticulturists as specialists until almost within our own memories. Fruits were prized and cultivated by the farmer and husbandman, and gathered in the wilds, for home use. If any were marketed it was as a secondary and almost a chance source of income. City people took it as an

accepted and unalterable fact that the products of the orchards, and of the hillsides, and of the meadows, were to be had, as a rule, only by going after them in the country, and either by personally collecting them from the natural vines and shrubs, or securing the coveted and appreciated articles through the liberal donations of rural friends. No one pretended to lay up a supply, for future use, of any fresh fruits except apples, or possibly of a few pears in addition. Drying was the only method known for preserving the perishable kinds. The season for each was short in comparison with the present—the earlier and later varieties having now greatly prolonged the period of production. It was very seldom that any one thought, in the years gone by, of fruits as food. They were appetizing delicacies or health-giving addenda to the real nutrients, mainly grains and meats constituting the daily and yearly furnishings of the table. Children, and often those of full human stature, sought, with quickened vision and nimble fingers, among the grass of meadows for the crimson strawberry; and, I dare say, more than one now present still feels a thrill of pleasurable emotion as memory carries him backward to the mild, rosy Sunday afternoon in June, when, along with the exquisite perfume and delicious taste of the red, wild berries, a softer and sweeter something was found, causing hearts of flesh to quicken in their throbbings, and pure lips to redden with something beside the tinted juice of the ambrosial fruit. The wild strawberry has not lost its unequaled flavor; but let us not despair if certain of our number never get anything from the cultivated plantations half so delicious. We ought to be charitable if "strawberries are nothing now in quality to what they used to be on the hillsides of New England."

The gardeners and vineyardists were just now excepted as the only professional horticulturists of earlier times. But the latter dressed the vine and watched the purple coloring of the clustered berries, as a business quite distinct from that of the producer of edible fruits. Their crops went into the fermenting vats and wine cellers. The vine-clad hills of Germany, France and Italy, and, still earlier, those of Assyria and Palestine, ran red with the rich juice of the grape, which, as a manufactured product, our State Society has pronounced not horticultural. The old viticulturists need not, therefore, be taken as pioneer specialists in our avocation. We may have learned many valuable lessons from them as observant and intelligent cultivators, but the propagation and care of the vine in wine-producing countries need not figure largely in the history of horticulture.

Let us turn to the professional gardeners. No country never had better natural and artificial conditions for the evolution of this specialist than Great Britain. Blessed with a fertile soil, and fanned by modifying and moderating breezes from the Gulf Stream, no spot of earth excels this remarkable island in the variety of plants that may be grown in the open air. Such possibilities were early appre-

ciated, and special attention directed thereto. The temperament and peculiar social condition and usages of the people were exceedingly favorable for the production of expert horticulturists. The rich and influential lords of the manors possessed the means of employing skillful workmen, and the more intelligent of the laboring classes esteemed it a high honor to fill posts of special duty upon the great estates. England's sailors visited all quarters of the globe, and English colonists established themselves in all climates, under all suns and skies. The rich contributions from the wide vegetable world were early accessible to English people as to none other. Why should we not look for gardeners as specialists in the earlier years of horticultural development in Great Britain?

But we shall look in vain for anything in English domestic history beyond two hundred years ago for such horticutural operations and requirements as would demand the services of a skilled gardener, such as we now know. The third chapter of the first volume of Macaulay's History of England gives a succinct and exceedingly suggestive picture of rural affairs at the time of the accession of James II. There were no regular mails, and newspapers were unknown. Roads were almost impassable, and traffic of all kinds tedious and expensive. The people lived upon what they could provide themselves, without interchange from abroad. As it was not easy to keep cattle over winter they were slaughtered in great numbers at the beginning of cold weather, and the flesh preserved with salt, produced by rude processes from brine pits in the neighborhood. The average wages of agricultural workmen were about four shillings per week and board, or eight shillings without board, while the price of wheat was something like the present figure. Few could eat wheaten bread. Rye, barley, oats and onoins formed the chief food of the great majority of the people. All drank beer, and I think we can readily forgive them. Cultivated fruits were exceedingly limited in quantity and certainly not high in quality. Dress was very plain; leather suits being especially esteemed for durability. No one wore underclothing, to be weekly turned over to the washwomen. Houses quite commonly accommodated the cows and the horses, as well as human beings. Money was seldom used in the business transactions of the rural people.

All these are indications of the habits of life of the English people in 1685, and all help us answer for ourselves what must have been the state of horticultural science and art. Of the former we may easily say there was none. Of the latter surely there was little practiced. In the "Household Book" of the powerful Earls of Northumberland, it is recorded that out of a household of one hundred and sixty persons in 1512, there was one man called the gardener, who is said to have attended "hourly in the garden for setting of erbes and clipping of knottis, and sweeping the said garden clene." This was within the reign of the epoch-making Henry VIII, and

certainly during his time the arts of peace in England, as well as the arts of war outside, prospered. His gardens became famous for their time, and apparently deserved the name bestowed upon them — Nonsuch.

In the commodious kitchen garden there were seventy-two fruit trees. We are not informed what these were, but that the royal plantations possessed so many is a sign of the times. Round about this plantation was a solid stone wall fourteen feet high — another sign of the condition of things three hundred and fifty years ago. In the ornamental portions of the grounds there were many columns and pyramids of marble, two fountains that spout water, one round and the other like a pyramid, upon which are perched small birds that stream water out of their bills. There is, besides, another pyramid of marble, full of concealed pipes, which spirt water upon all who come within reach." One of the fountains was "set around with six lilac trees," and these are the only trees mentioned here, though there were parks and shady walks elsewhere.

After this time onward one hundred and fifty years the royal gardens were laid out in mazes and labyrinths, with concealed pipes by means of which visitors might find themselves lost one minute, and deluged with water at the next." We may say that professional gardening began later than this, and probably we shall not be too exacting if we name the time of the Restoration as the low beginning of this art. Certainly a comparison of the works undertaken during the reign of Charles II, stimulated by the Le Notre's achievements for Louis XIV at Versailles, with those of any public grounds now does not leave much opportunity for enthusiasm upon the beauties of the historical pictures. Geometrical figures, clipped trees, of which Bacon, ahead of his time, spoke contemptuously as "images cut out of juniper and other garden stuff," heavy stone walls and iron gateways and railings, high terraces and brilliantly painted lattice work, together with labyrinths and grotesque surprises in the way of water-spouts operated by concealed springs — these and such as these characterize the taste of those days.

At length the criticisms of Bacon, aided by the gorgeous imagery of Milton in his description of the celestial paradise, and the ridicule of Addison and Pope, culminated in drawing fresh attention to matters of landscape gardening, and thus opened the way for what we now know as the natural style. A few men became celebrated as specialists and artists, and many others profited by their examples. The great estates were laid out and cared for with increasing attention and ability. Much more interest was taken in orchard fruits and garden products. Glass-houses were erected — the first in 1717 — for the growth of tender plants, and men began to learn gardening as a professional occupation. Since that time England has done much for horticulture in every line. Thomas Andrew Knight, the first President of the Royal Society, was enthusiastic as an experi-

menter, and his studies gave impetus to the science, as well as to the art of plant-cultivation and produce. We still smile at some of his notions, but his efforts were certainly crowned with great benefit to horticulture, and so, to many thousands of his countrymen. It has only been, however, within very recent years that professional gardening in England has been more than a trade, learned by apprenticeship. Schools for the purpose have not been known, and private tuition has been irregular and expensive. Most excellent opportunities are now offered the young specialist at the renowned gardens and laboratories at Kew. Science-teaching, also, is taking hold of public instruction, as to make progress in all such practical affairs much more rapid and certain.

In the United States we can easily trace the development of horticultural practice and theory. The beginning, in any important sense, is a thing of our century. As elsewhere the earliest attention was paid to useful, — in our case mostly edible, — products. Except for the cultivation of the common kitchen vegetables, little was done in a systematic way in the early years of the nineteenth century. Even several important garden products, like tomatoes and celery, came into very tardy use. Apples and pears were almost wholly seedlings, and no commercial nurseries existed where grafted fruit was offered for sale. No one thought of cultivating small fruits, except in occasional instances where a very small bed of foreign varieties of strawberries was made as a garden novelty. No periodical horticultural literature existed; no societies met for discussion and instruction. The Massachusetts Horticultural Society issued its first "Transactions" in 1829. The "Magazine of Horticulture, Botany and all Useful Discoveries and Improvements in Rural Affairs" — the first of its kind — was started in Boston by C. M. Hovey, in 1835. The enterprising editor still survives, a witness of wonderful changes, in which he has himself largely participated. *The Horticulturist*, edited by A. J. Downing, was commenced in 1846, and one can almost read in this the beginning of true horticultural practice and taste in our country. Certain it is, the journal gave great impetus to the cause it advocated. The great seed industries and magnificent nurseries which we know, are not over fifty years old. James Vick started his business within the memory of his living sons, carrying at first his packages to the postoffice in a basket upon his arm. It is not far incorrect to say that grape-growing commenced with us in 1827, when Major Adlum introduced the Catawba to the public attention. In Kenrick's *New American Orchardist*, published in 1848, the American varieties of grapes deemed worthy of mention are the following: Alexander, Bland, Catawba, Elsinburg, Isabella, Ohio, Norton's Virginia, Cunningham Prince Edward, Woodson Prince Edward, Scuppernong and Worthington — eleven in all, of which four only are still known to the ordinary viticulturist. Peaches were much earlier raised in abundance, and

of numerous kinds, but very few were marketed in the fresh state until after the first half of the century had passed away.

I need not pause to contrast with all this the horticultural products, literature, societies, commission-houses, professional specialists, capital employed, etc., of to-day. The difference is prodigious. When one collects the abundant evidence of the present horticultural activity, it is amazing to find that this evolution has been from the small beginning of fifty years ago. Nothing equal to it has ever before occurred in horticultural history. Those who have taken an active part in the energetic advance — and they are usually still living — know that progress has not come without effort, and that continuous, uninterrupted prosperity has not been the rule. It has sometimes taken great faith in the ultimate outcome to keep up heart; but, upon the whole, it is acknowledged by all that signal triumphs have been achieved, and that the people and the age have been vastly benefited by the accomplishments.

If we now make inquiry as to the causes of this wondrous evolution in our times and in our country, of a world-old art, we shall enter upon a problem containing a multitude of factors and elements, most of which, however, are easily obtained and comprehended.

In the first place, ours is the century of rapid development, and ours the country, above all others, of marvels in progress and attainment. This is no Fourth-of-July buncombe. It is not immodest in us to speak of facts so patent and indisputable. The world never before saw so much change in all that relates to health and comfort, and convenience of living, within any one man's memory. Never before did man have such mastery over nature, rendering it possible for him to accomplish what is now done. The application of the forces of nature, harnessed and guided as never before dreamed of, has multiplied man's muscle and stimulated his brain until the biblical figure of "one chasing a thousand, and two putting ten thousand to flight," is realized in numerous ways. A recent writer has shown that the musket has been a prodigious power in civilization. If so, we, as horticulturists, must admit that gunpowder has helped bring about the present flourishing condition of our calling. People laughed at Fulton trying to force a boat up stream "with boiled water," as they derisively framed the words. But the steamboat has been no mean agent in the dissemination of useful plants and in the distribution of the cultured products of plants. Railroads have rendered still more effective service, as the immense trains carrying fruits now testify. They have rendered civilization possible in many portions of our inland regions, and literally have caused the wilderness to blossom as the rose. Within my own memory, men thought the great prairies of our State would never be occupied. People would freeze to death in winter without fuel, and burn to death in autumn by the great billows of fire that madly swept over the land. They would perish for water and starve, without hope of succor, in the

vast stretches of tough sod. The railroads and the cast-steel plow have changed all this; while the cultivators and harvesters, the corn-planters and grain-threshers, have taken heavy loads from the merely muscular man, and permitted him to think of something besides hard physical labor in the essentials of life.

Among the general reasons for the special activity of which we speak, we must not proceed far before mentioning the increased intelligence of the common people. Never before did cultivators of the soil *think* as they have lately done. Operations are performed now for an assignable reason rather than because some one else had done so before. We do not follow the paths beaten by our ancestors unless our educated senses and corrected observations confirm the lessons handed down to us. Science has taken the place of mythology in our schools, and children of our times are taught that it is perfectly right and proper to gain knowledge at first hand, and to question current opinions, even though expressed in printed books, if they appear to conflict with direct observation and experiment. Baconian philosophy and faith in the stability and reliability of the laws of nature, have given an entirely new direction to effort, and made cause and effect stand related as they never stood before. So long as men and women depend upon joining hands in a circle about an apple tree, and chanting some cabalistic utterances while they danced, to make the tree fruitful; so long as planters really believe that the enchanting influence of some mumbling old woman is the only essential in the keeping of seeds; so long as the phases of the moon are consulted, rather than the qualities and condition of soil, in deciding the time to plant; so long as quackery and witchcraft are allowed to lead, instead of sense and reason — just so long are the arts of horticulture belittled and benumbed, and the science pulseless and dead. No progress is possible without rational experiment and well interpreted observation. Sir Joshua Reynolds, when asked with what he mixed his paints, retorted, "With brains!" So the progressive horticulturist mixes his composts and tempers his processes with brains. Say what we may of fruit growing and flower growing as the poetry of agriculture, as the divinely appointed recreation of our first parents in Eden; say what we please of the delights of rosy beds and fragrant bouquets, of peaceful pleasures among climbing vines and fruit-laden trees, there is, after all, a foundation of pure, cold, unemotional, law-governed and law-giving science in all horticultural operations.

There is always a great demand for hard labor and watchful care, in which it is hard to find much poetry. Sentiment does not hoe the garden nor fight codling moths. It does not even pack ripe peaches in baskets, nor arrange roses and carnations in bouquets. Labor, God-appointed, man-honored and man-honoring labor, is the magic that transforms soil and sunshine into perfumed flowers and luscious fruits. The horticulturist earns his bread by the sweat of

his face, but not by that of his face only. The muscular toil is, after all, only a supplement to the mental activity. Careful, clear-headed planning and intelligent, cause-seeking reasoning stand before labor, and come after it, commands it and reaps its rewards. A man may succeed in a special line upon the imitative principle, just as a monkey learns to crack nuts with a hammer, but he is in constant danger of disastrous failure by changes in conditions and requirements. Our illustrative monkey would just as soon use a dynamite bomb as a hammer, and whether there was afterward anything left of him, or not, he would never know why that particular nut behaved so furiously sensitive. We too often, to use a common figure, get our fingers burned without having seen the fire into which we carelessly thrust our hands. Practical horticulture demands resolute hands, but more than all, and above all, educated and quickened minds. The dreamy theories and dainty mental discipline of too many schools in former times, tended to divorce mind and manual effort. Education and money-gaining business were considered, if not antagonistic, at least not properly associated and mutually helpful, as if men in the world and of the world should be educated out of the world of practical affairs. Great changes have been made in our ideas and in our practices in this regard. The directly useful and practically serviceable has been pushed to the front in our selection of studies for the common schools, as well as for the so-called higher institutions of learning. "Learning and labor" is not considered an inappropriate motto for a great State university. Fifty years ago such a thing as this did not exist even in sentiment, much less in actual fact.

Without trying to make a complete survey of the causes of the recent advancement in our art, one more may be named. In political economy we are taught that the demand creates and regulates the supply. In horticulture there is a sense in which this is directly reversed. The supply actually creates the demand. When choice fruit, in neat packages, is offered in the markets, people will buy who never would have thought of *seeking* for the products. At first they purchase fruit as an occasional indulgence or luxury. It is taken home to the children as a novelty. It is eaten as a relish or a sweetmeat. Though there is no craving of the appetite, after the manner of some drinks and drugs, there is a likelihood that the first indulgence will be followed by a second, and the second by a third, until after a time the idea of indulgence or luxury is lost in the better idea of daily food and prophylactic medicine. So, also, with flowers—one may be inclined at first to say that money or labor spent for a bouquet upon the dinner-table is sheer waste or prodigal expense. But when, from the facility of procurement and the presented temptation, indulgence becomes more and more common, the feeling passes into a real want. The former prodigal begins to realize that man shall not live by bread alone, that there is a hunger

of the eye just as insatiate as the hunger of the stomach, that the appropriate food for the one is just as proper a provision as for the other. Habit has much to do with all our affairs, and habit in the use of horticultural products is no exception. A thousand times more strawberries can be sold now in the city markets than could have been disposed of fifty years ago at the same price, to the same number of people; almost solely because it has now become the custom of these people to buy — not by any means because the fine taste of the berry has just been recognized. As it is with those who buy, so it is with those who cultivate fruits and flowers for themselves. A beginning once made, there is almost sure to be enlargement and increase of attention. Instead of resting content with corn bread and smoked bacon for dinner, rich gardens, carefully tended, are soon considered indispensable adjuncts to the farm and household possessions. The lawn is planted with trees for ornament, as well as for shelter, and the grass is leveled and condensed into a velvety turf for pleasures which rank above the gratifications of the palate, and which indicate elevation and refinement of life.

Such are some, and only some, of the general and less direct causes and influences that are conceived to have been instrumental in bringing to its present state the horticulture of our day. Among those of more immediate effect, too much cannot be said in commendation of the rural press, a thing itself of recent years, and an outgrowth of as well as a stimulus to the marvelous developments of which we have spoken. The influence in the past and in the present of societies, such as ours, very largely missionary in their idea and effect, has certainly contributed very largely towards private and public enterprise in horticultural matters and set in motion the wheels of progress in many directions, tending to enrich and adorn our homes and our land. Nowhere else in the wide world has there been such horticultural gatherings of interested and enthusiastic workers and counselors, nor such magnificent displays of fruits and plants of varied kinds and high excellence. Our own Illinois State Society is one of the pioneers in the good work, and long ago might have rested upon its laurels with high honor to the enterprise and philanthropy of its leading spirits. Its work, however, is not done, and no one thinks of halting. Our special section of this honored State Society has only lately become active in its efforts to help push along the influence and teachings of its parent. Its useful history is short, but history can tell of valuable work already done, and of the will to do we to-day testify.

On motion, Henry M. Dunlap was appointed Treasurer *pro tem.*, and C. N. Dennis and Dr. Humphrey an Auditing Committee.

## THE RELATION OF HORTICULTURE AND AGRICULTURE TO OTHER INDUSTRIES.

BY MRS. R. H. MEAD, GALVA.

*Mr. President, Officers and Members of*
*Central Illinois Horticultural Society:*

*Ladies and Gentlemen:*—It is difficult to define the line between horticulture and improved agriculture. We would rather ascribe the term "trinity" to agriculture, horticulture and floriculture, the three different forms in which God reveals himself to us through the soil—three in one, and one in three; the three fundimental qualities in the Deity—Power, Wisdom and Love.

Horticulture is the most perfect method of tilling the earth so as to produce the best results, whether the products are objects of utility or of beauty.

Agriculture is the art of cultivating the ground, and obtaining from it the products necessary for the support of animal life; the art of rearing those plants and animals that are best suited to the wants of man. Since God created the earth agriculture has existed. There is no occupation that precedes it. Before literature existed, before governments were known, agriculture was the first calling of man.

An all-wise Creator has so arranged everything in the universe that, to a great extent, all is linked together, and *all industries*, in a greater or less degree, are necessary, one for the existence of the other.

In ancient Greece, the art of farming gradually advanced, until, in the days of her glory, in some of her provinces it is said to have attained a high degree of perfection. Many of the implements of husbandry in use among them were not unlike those of modern construction in principle, and extensive importations were made from foreign countries, of sheep, swine and poultry, for the purpose of improving their stock. The Greek farmers composted with care and skill. They understood the importance of thorough tillage. They cultivated the apple, pear, cherry, plum, quince, peach, nectarine and other varieties, together with figs, lemons and many fruits suited to the climate. However, agriculture was not a source of pride with the Greeks, as it was afterward with the Romans. One cause of this was the fact that the land was tilled by a menial race, the dominant race cultivating other arts, and caring more to build up their cities than cultivating the soil. On the contrary, a high appreciation of agriculture seems to have been a fundamental idea among the Romans. With them a tract of land was allotted to every citizen by the state, and each one was restricted to the quantity granted. It was said that he was not counted a good citizen, but, rather, a dangerous man to

the state, who could not content himself with seven acres of land. The Roman acre being about one-third less than ours, the law actually limited the possession to about five acres. This was only in the early days of Rome. Afterwards, as the nation became more powerful and extended its limits by conquest, the citizen was allowed fifty acres, and later on he could be the holder of five hundred acres among the Romans, according to Pliney. Small gardens filled with roses, violets and other sweet-scented flowers, were in repute, while many of the choicest plants and flowers which we now cherish were cultivated by the ancient Greeks.

Horticultural art declined, however, with the fall of the Roman Empire, and not until long after did it revive, under the Monastic institutions. In England, pleasure gardens, with fountains and shady walks, with hedges and designs, were known from the time of the conquest, but it was not until the construction of conservatories for the preservation of tender plants, that horticulture made much progress. According to London, it was not until the year 1717 that such structures were built with glass roofs — and from this time a new era of gardening began. The education and training of young persons to the practice of gardening, raised the occupation to an art, and has brought horticulture, in European countries especially, to a high rank.

We have considered horticulture as the acme of agriculture; and those familiar only with ordinary farm tillage would be surprised to find how productive land can be made, when husbanded by practical gardening.

In the best market gardens, the soil, by abundant fertilization or manuring, and working, is kept up to the highest attainable state of fertility, and is made to always produce two, and sometimes three and four crops in a year. It often happens that a single acre, near a large city, yields the cultivator a greater profit than many entire farms bring their owners.

Within the last thirty or forty years, horticulture, in the United States, has rapidly advanced, and its progress has been largely due to the influence of the various horticultural societies, of which our own State Horticultural Society takes rank as among the best. We have very few magnificent gardens, but in the diffusion of a knowledge of horticulture among the people at large, there has been a steady advance, and a special literature pertaining to the science and practice of horticulture, has been published by the societies, for the last twenty-five years, under the head of "Transactions of the Illinois State Horticultural Society," which makes, in itself, a library of valuable information, every volume having furnished many valuable facts, statements and suggestions, pertaining to horticulture as an educator. No study offers so many inducements — so attractive that nearly all instinctively drift into, from the very love they have for it — as horticulture. How varied the field of information — how much

it embraces, and how it leads from one thing to another, until the imperfect horticulturist becomes a scholar.

To the horticulturist belongs the forest, the garden, the flowers. The trees are needed for fruit, shelter, shade, and ornament. The material of which they are composed, builds our houses and barns, and is manufactured into every conceivable form to supply the wants of man. It is impossible to estimate their value.

The palace and the hut are alike dependant upon the trees for construction. The vast machinery which man has invented is largely composed of wood. The furniture in our homes, whether plain or carved, or inlaid with mother-of-pearl or gold; whether rosewood or mahogany, walnut, oak or pine, they were once kings of the forest. From the yacht to the steamship, which is launched on the ocean, and is buoyed on its turbid waters, we see what was once growing in the forest.

They keep us warm in winter when used as fuel, and cool in summer as a shade. We must preserve them, we must cultivate them.

G. W. Minier, President of the American Forestry Congress in the United States, says that twenty per cent. of all the land should be planted in trees.

They influence the rain-fall, and in a thousand ways they contribute to our happiness and comfort.

The sentiment of the poem, "Woodman, Spare that Tree," should be felt by every American citizen.

Of all the varied productions of the soil, fruits, in their almost endless variety, are the only portion of our food which Nature furnishes ready for our immediate use, and by this we are admonished that fruit should form a large portion of our daily nourishment. But to secure such supply, in pleasing and wholesome variety, we must be diligent in planting and cultivating those fruits adapted to our soil and climate. If we hope to enjoy the fruits of our orchards, our vines and our berries, we must cultivate them. If we hope to enjoy the flowers, the shrubs, the evergreens, and the ornamental trees which can be grown in this latitude, we must cultivate them. Of all the means for smoothing the wrinkled brow of care; for tranquilizing the mind of the suffering invalid; for elevating the mind to higher and nobler purposes; and for making life happy, none have more influence than a home surrounded with the wealth of Nature, displayed in trees, fruits and flowers.

While in the enjoyment of life, erect your own monument — plant an orchard, set out fruit trees every year; plant them not for the present only, but for the future, and when your children and children's children, or the stranger that may come within your gates to rest beneath its shade, and eat the fruit thereof, your name may be spoken of as one of the benefactors of mankind, if he who causes two blades of grass to grow where only one grew before, is

greater than he who conquers an empire; how much greater is he who leaves his successors an abundant supply of fruit. It is not enough that our tables are supplied with bread and meat, our physical well-being requires a due proportion of easily digestible, fresh, crisp garden vegetables, with appetizing and health-giving fruits.

Horticulture has much to do with hygiene, and the agriculturist can ill afford to ignore its importance in this respect. Every farmer, so far as the interest of his family is concerned, should give some attention to horticulture. We should be much the gainers if we would look more to our orchards and gardens for our medicines, and less to the drug stores. The small-seeded fruits, such as blackberries, raspberries, currants and strawberries, may be classed among the best foods and medicines. The sugar in them is nutritious, the acid is cooling and purifying, and the seeds are laxative. To cure fever or act on the kidneys, no febrifuge or diuretic is superior to water-melon. The water or juice alone should be taken.

It is no less strange than true that the table of the day laborer in town, who does not own a foot of land, and whom the farmer contemptuously declares "lives from hand to mouth," is more bountifully supplied with vegetables and fruit than that of the agriculturist, in the midst of his broad acres. The latter gives a variety of excuses for his neglect of the garden, and lives on, regardless of or indifferent to the fact that no acre of his farm will yield so much *good living* and do so much to promote the health and happiness of his family, as a garden intelligently tended. Even so small an area has infinite possibilities to be developed into a rich reward.

At the Farmers' Institute, held at Red Wing, Minn., Jan. 27th and 28th, 1886, Mr. Pearce, of Minneapolis, gave an interesting and instructive talk on raspberries. At the close of his address there was a lively volley of questions, as to varieties, of manure, time of covering, yield per acre, cost and value of crop, which were satisfactorily answered. He said the entire cost of planting and caring for an acre was less than one hundred dollars, the possible yield ten thousand quarts, selling at twenty-five cents per quart, or two thousand five hundred dollars per acre.

The love of the beautiful is rapidly growing with us as a nation; flowers are everywhere in requisition, and silently exert their refining influence on humanity. They are the emblems of purity, beauty and innocence. Flowers are an expression of thought, and bear a strict analogy to language. Florigraphy in early times was much cultivated — it received great development at the hands of the Roman Church. The variety of the flowers that adorned the altar enabled the worshiper to distinguish between feasting and fasting ceremonies. Flowers have had an important part in all mythologies. Oak was the patriot's crown, bay the poet's, and the myrtle the crown for beauty. The olive was the token of peace, as the ivy was the emblem of Bacchus.

The Amaranth has been selected to typify immortality, and is referred to in Longfellow's poem, "The Two Angels." The varied and magnificent flora of America offers a vocabulary replete with brilliant and original tokens.

Flowers are also emblems of several European countries, such as the Fleur-de-lis, of France; the Thistle, of Scotland; and the Shamrock, of Ireland.

The last few years, with us, have been educators of the public, in matters of taste for artistic work in flowers, to greater degree than most of us yet realize. A careful inqury will show that the business of the horticulturist has not been depressed like other industries, and that the sales have constantly increased, and are still going on with accelerating ratio.

Hon. Jonathan Perram, of Chicago, says that horticulture was, and always will be, the fine art division of agriculture, and that high, civilized enlightenment was never reached without the accompaniment of flowers, and garlands woven by the hands of women, weaving them into the varied and beautiful forms that grace our parlors and banquets; and, we might add, very many other places both public and private, from the cradle to the grave. Flowers are pre-eminently attractive to all tastes, and whatever shall render home more attractive, more beautiful, more complete, is well worthy of our attention, Nothing in the world of Nature is more more elevating and refining than flowers. The lovers of flowers are more apt than others to lead noble and upright lives. This is not strange. The beautiful coloring, the wonderful tints, incapable of being produced by an artist's colors; the delicate lining, and veining, show the touch of the master painter. The fine mechanism by which the fibres draw from the black earth food for growth, and coloring for beauty; the intricate construction, not to be imitated in the most delicate wax, point to a master builder. If these things are true, the most potent influence for good, for elevating the thoughts, and ennobling the life, outside of the personal influence of parents and friends, are to be found among the flowers. Accord to them a fitting place in the home life. Cultivate the beautiful flowers. Make an attempt; those who have never tried can never realize what a pleasure there is in it. How much of the happiness of rural life depends upon the care bestowed upon the home, the grounds, the garden, the fruit, the flowers, the domestic animals, and every living creature, by ourselves, can only be estimated by those who have bestowed that care, and who have derived the pleasure it affords. The cultivation of flowers seems to weave about us a magical spell, and many are the inspirations we receive therefrom.

I would like to make a strong appeal to women for a more general cultivation of flowers, as I believe in their humanizing influence—in the lessons which they teach. It is a labor which has a moral influence. The mother who loves flowers will soon interest her chil-

dren and infuse them with the same feeling. A love of flowers is a love of the beautiful, is a love of the good; and thus we are led on, step by step, in the grand march of improvement. It is said that flowers are the medium of communication from angels to mortals; and may we not believe this, since they are found everywhere, from north to south, from east to west. They appear on the mountain-top and in the valley: on the dry, arid plain, and on the surface of the quiet lake. The most beautiful songs of the poets, uninspired save by the silent influences of nature, are of the flowers.

Honored by God, recognized and immortalized by earth's greatest men, flowers are worthy our consideration. We read that God Himself planted the first garden. He fixed its foundations. Each fruit-bearing tree, and each flowering shrub, took its place in the Garden of Eden by the direction of Jehovah, as certainly as the stars with which he decked the skies. We think of God as the builder of the universe, of suns and planets, and of systems of worlds; but it should be remembered that He came down to earth, not as at Sinai, amidst thunder and lightning, but in Eden, where He planted a garden, and placed Adam there to tend it. Here, then (we say it reverently) we have the Creater and Adam proprietor and tenant, engaged in the first agricultural and horticultural enterprise of which history supplies an account.

Hence we claim for horticulture a Heaven-ordained rank — an exaltation such as belongs to no other occupation known to the human family. The time is not far distant when young men will esteem it as an honor to be known as agriculturists and horticulturists — scientific tillers of the soil. And when farmers, by their learning, their ability and their influence, will compel the acknowledgement that agriculture and horticulture, by the vastness of its investments and untold millions of contributions to the wealth and welfare of the country, is entitled to the highest recognition in the affairs of government.

Dr. Hall — I agree with the essayist, that a fruit diet is conducive to health.

G. W. Minier — Horticulture is the religion of agriculture; no man can be a good agriculturist if he is not a horticulturist. I hope this paper will stimulate the ladies to come to these meetings and take part. When every Roman had a home they were all patriots. Give every American a pleasant home, however humble, and we will hear nothing of anarchists, strikers or labor agitators.

Song by the Glee Club:

"Larboard watch ahoy."

## THE LAW OF GROWTH.

BY MRS. A. E. CONNABLE, HAMILTON.

From our observations of Nature, and knowing that the law of growth is applicable to every thing that has expansion and cultivation, from the smallest blade of grass to the highest, the human soul,

That link 'twixt earth and heaven,

and that there is no chance work in Nature, and taking all growths in consideration, then the law of growth must be upward. That this is so is the result of the operation of the law, that makes the general result of all growth in the animal and vegetable world an upward growth. There is such a mutual dependence between the animal and vegetable existence, that we cannot speak fully of one without the other. For the very preference of the vegetable world is essential to the animal with their life giving oxygen, and in picking up inorganic matter and changing it into organic, so that it is ready for our own consumption; and the animal creation return the compliment by furnishing them their carbonic acid gas which bears the same relation to them that oxygen does to the animal, and so it is that the one re-live upon the other. So far as growth produces motion or change of position in the vegetable world, we may say that it originally had no tendency, either upward or downward. The motion of this growing plant, whether in root or stem, follows the law enunciated by Spencer for all motion. It must grow along the line of greatest traction and least resistance. All things under cultivation, let it be one garden, field, or orchard, contain the same elementary constituents, yet no two of them in the same proportion. They are carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorus, potassium, sodium, calcium, magnesium, silicon and chlorine. These plant constituents are furnished in part by the surrounding atmosphere and by the soil, which is defined by the chemical analysis of the word earth, as a tasteless, inodorous, uncolored, earthy looking metalic oxide, or alumina, glueine, zirconia, ythria and thoria, each plant has its own wants at different stages of its growth; some require more nitrogen in the latter period of growth, blooming and forming seeds. Others call for a greater amount of hydrogen during the blooming period.

And yet not one of the essential elementary mineral constituents can take the place of another without changing in many instances in a serious way the relative proportion of the organic constituents of the plant. I will say, in this connection, that to produce a vigorous growth every essential food constituent of the plant under cultivation must be supplied, so, when called for, it is in readiness for the required want. We give the grain of corn a certain

care — what it wants — and it repays us with a harvest. We only get what we give, and to nothing is this truth more vitally applicable than to our flowers and gardens. A perfectly healthy growth of plant or tree, having all of its needs of rootlets supplied with proper food and moisture, with the soil properly tilled, with plenty of light, air and heat, will produce perfect foliage, fruit and flowers of its kind. The fact that insects do not as often attack a perfectly healthy tree or plant is sufficient in itself to satisfy the most skeptical that a starved parentage cannot sufficiently vitalize its kind. The food elements depend upon the perfect growth to maturity of either vegetable or fruit. One to be successful must ever be on the alert, or nature, uncurbed, will give us a great, straggling bush or tree, that will be choked and rendered barren by its own luxuriance. Air and light are essential to perfect growth, and the knife must make space for them, for cutting back and shortening branches develop fruit and flower buds, otherwise we will have long unproductive reaches of wood, which are far from ornamental and entirely useless.

Pruning naturally leads us to the subject of propagation, for much of that which is cut away is of great value to the nurseryman and florist. The skillful cultivator will preserve the most healthy cuttings, and, if treated in accordance with their demand for moisture and coolness, they grow with almost certainty. If subjected to heat and drouth, they will soon become like dry sticks and die. This necessitates our planting cuttings in the early spring, or in the fall. The wood-cutting, like the root-slip, must make a callus at its base before there can be growth, from there the root starts out and pushes itself in the direction in which it finds food for further growth, provided it does not meet some resistance which stops its progress in that direction. In the cultivation of house plants the smallest pots are used, so that the roots may soon meet with resistance, and then they will throw their strength and nourishment to the plant above.

Looking at any of the common wild flowers of our prairies we find that everything concerning any one of them, whether the shape or the length of the petals, or the shading of the beautiful colors of those petals, or the delicate perfume from the flower, or the usefulness of fruit or fiber, all come from the adaptation of the plant to its surroundings. But the roots beneath the soil, which have no complexity of surroundings, all grow alike, and it would be difficult for an expert botanist to distinguish the roots of widely different orders of plants. To the upward growth there are limitless possibilities; and in the reports of the horticultural journals we find that every year some tree, shrub or fruit has grown to immense proportions, or has surpassed last year's growth in beauty and usefulness, so that we cannot say any one contains all the beauty and perfection, and so long as man shall cultivate and renew and experiment

on old growths we will have new forms of the original kind; but we must ever aim to improve, to change the form, but not alter the value. For nature is no tender mother, and always punishes those who infringe on her laws. Some of our plants grow so rapidly that we say we can almost see them grow. Watch the blossoming of the night-blooming cereus and leaf after leaf unfolds before your very eyes, yet, you cannot see them move, but you feel as though you were in the presence of some mysterious power, for a hand unseen is scattering its beauty and fragrance like a summer rain, it remains a perfect flower for a short time, then it draws its beautiful white foliage around it, drops its head before a mighty power and sinks away. So it is with all growth, each one has its beauties and perfection, but require a longer time to mature and fade. It is in adapting itself to circumstances and surroundings that nature's growths become beautiful and useful to man. The universal law of growth belongs to man as truly as it does to the humblest plant or flower — everything that has the power of growth, from a grain of wheat to a child or man, must have culture and nourishment. For, like garden flowers, the little ones grow and they must be nurtured and trained with the greatest care, and warmed by love's sunshine, and hatched in its dew, they will bloom into beauty like roses rare. The little ones are like fertile ground ready for seed, each impression ready to take form, and his growth naturally leads him to satisfy his greatest desires, and to shun the least pain. So that the pruning-knife of virtue and right must ever be in use to give tone and form to the character by making it of service to itself and others.

"What the leaves are to the forest,
With light and air for food,
Ere their sweet and tender juices
Have been hardened into wood.

"That to the world are children;
Through them it feels the glow
Of a brighter and sunnier climate,
Then reaches the trunks below."

In our lives, or in plant life, there is plenty of room for upward, and only a little room for downward growth. If we follow our lower desires, and they are not controlled, then poverty and disgrace hedge us around; for retribution soon follows a low action, as the spiritual law of gravitation will, sooner or later, draw all spirits to their true level. We can not always judge of a man from his exterior, for heaven sometimes surrounds a rare character with ungainliness, as the "burr that protecteth the fruit," so that it may attain its full growth and development before being disclosed to view. This is true of some, but we can not say of all, for we will find that "wheat and tares will be strangely mingled in the harvest field of time," and those possessing higher desires must be cultivated, guided

and stimulated so as to produce a perfect character; but it would not do for us all to mold our liber after one ideal pattern, for no one type of character can possibly embrace all the human beauties and beatitudes.

> "Our lives are mosaic; your own has been placed
> In a vacancy no other life could have graced;
> Fill it well—thus will grow the harmonious whole,
> The brilliant design, one stroke nearer the goal."

We are living in a fast age, when every production must be pushed; in other words, when nature's growths must be sooner brought to maturity. Man is getting impatient, and can no longer look upon the sturdy oak tree as a symbol of his country's growth, for it is too slow. For the first hundred years there has been a great similitude. It has taken that long for our country to become what it is, and its fostering care has been reached out to the emigrants of other nations, as the old oak is ever ready to protect and shelter any that come within reach of its branches. But the oak for the next hundred years will keep slowly growing and maturing, while our country rushes along as a mighty torrent; for we stand on the shoulders of past generations, and so are able to see farther than they. The long growth of their knowledge and inventions, gained by their struggles, successes and failures for centuries past, is given to us. We have the benefit of other men's labor, as we have inherited the past tendencies and habits, and the underlying spirit of our lives, and we can not do otherwise than improve, for we are the heirs of past generations, and as old Father Time, in his march onward, touches the aged and gray who stand where the "brook and the river meet," soon to pass to the other side; and looking over the record of their lives, we find they have slowly but surely grown into eternity.

Dr. A. G. Humphrey—I feel that I have a "crow to pick" with the ladies. Just as I have a subject matured in my mind, and think I can write on it, along come the ladies and "steal all my thunder."

C. N. Dennis—I wish to call the attention of the ladies of Elmwood to these papers. A year ago, we held a meeting of this society at Hamilton, and assigned the ladies the work of decorating the hall. They therefore organized the "Montebello Floral Society," and went to work systematically. Those who were present at that meeting know how well they succeeded. I hope the ladies of Elmwood will organize a society of this kind in connection with the Horticultural Society.

## ILLINOIS FORESTRY.

BY G. W. MINIER, MINIER.

In all of God's arrangements, the grand, the sublime, and the beautiful prevail. The primeval forests of Illinois are, by the hand of man very greatly changed — in some localities, almost obliterated. The pioneers were dependent for their cabins, and all other buildings, as well as fences and fuel, on the groves and timber belts. Hence, the first settlements were either in groves or along their margins. The annual fires of the then seemingly boundless prairies, kept back the the timber growth, and confined it to the banks, shores, and tributaries of the rivers. Occasionally a grove isolated and detached, was seen, which upon investigation, was found to have started on a northern declivity, thus protecting the first planting of Dame Nature from the fires of the aborigines and first settlers.

Shakspeare tells us that Mab, Queen of the Fairies, travels in a carriage made by the joiner squirrel or old grub, from a hazel nut; and that they are, and have been "time out of mind the Fairie's coach makers." I have not the temerity to dispute so high authority, but in plain, blunt prose, will say that the squirrel, the bird and the winds, have been, time out of mind, Nature's tree planters. Nature drops first the minute seeds from which spring the herbaceous plants; next the hazel is brought by the squirrel or bird. A spongy surface is thus prepared for the winged seeds of the maples, the elms, and the cottonwoods. And now the birds and small animals make the infant forest their home, and bring from other woods the nuts, the acorns, and cones, until in primal beauty stands "God's first temple."

### A TYPICAL FOREST.

In McLean County, of this State, lived, a few years since, a practical man, of good, hard common-sense. We, lucky fellows (?) who spent years of life at schools, would say of him that he was not learned.

It was my good fortune to know him personally. He honored me by placing, for a short time, one his sons under my tuition. I just wish to say, in passing, that this old man was one of the best educated men I have ever known. His faculties were drawn out. Stuffing your books into the brain may make a man of knowledge, but training the use of the faculties makes the educated man.

Mr. President; I'm wearied, and well-nigh disgusted, with this system of stuffing science into the minds of our boys and girls, and when they get out of college they don't know how to get a livelihood in a world which God, in infinite love, has filled with boundless possibilities. And worse than this, some of our boys are returned to us with the three graces of rum, swearing and tobacco.

Now if you will pardon this digression, I will say that Isaac Funk, an honored Senator of Illinois, is the man to whom I refer. In early times for Illinois he purchased a grove which still carries the name "Funk's Grove." It is still in its entirety, owned by his children, I think, with beautiful farms on all sides. In conversation with three of his sons I have gathered the following facts: In their early recollections many brambles and small trees, as the plum, pawpaw, hazel and crab-apple grew upon the outskirts. These have mostly disappeared, but the useful trees are still mostly standing. The black walnut, that prince of deciduous trees, white oak, burr oak, chniqua-pin oak, black oak, blackberry, linn, elms, white and blue ash, with some other less valuable varieties, make up the grove which furnished a large amount of fencing material and fuel, and in the last few years they have sold at least $30,000 worth of black walnut timber from this grove, and yet, to a casual observer, it stands intact. Three thousand acres, let us suppose, which is probably four hundred too much; yet at this generous figure the yield is ten dollars an acre, and the grove still apparently entire.

I have called attention to this one instance, of many which might be given, to ask this body of thinking men to think of the marvelous capacity of Illinois in the cultivation and conservation of timber.

By the most careful estimates we find that a very large area of our forests is annually used for railroad ties, not less than 60,000 acres in all the States, and for Illinois at least 20,000, and a larger area is consumed by forest fires. This state of affairs is alarming; and the problem forces itself upon us, and thoughtful men are awakening to its solution.

But the usefulness of groves and timber belts cannot be estimated in mere dollars and cents. Since the removal of the tall native grasses, at the sources of our creeks and rivers, every thoughtful person has noticed the failure of our water supply in the latter part of our summers, and on dry occasions, such as at present. Could the sources of our streams be but partially covered with timber growth, these streams would return to their pristine usefulness and vigor. The common observation is that showers in dry weather will pour down on groves and timber belts, while fields and farms in the vicinity are almost parched.

Gentlemen of this Convention, to you and men like you must we look for the energy, the industry and the forethought to supply the impending want. Shall we look in vain? I believe not. Through the far-searching influences of societies like yours in almost every State has grown up a more than a National society. For Canadian Foresters came knocking at the doors of the "Forestry Congress of the United States," and our northern neighbor was admitted and welcomed, and six years ago, in the city of Cincinnati, was framed the "American Forestry Congress." The appellation,

you see, gentlemen, if not quite catholic, is at least continental. Our fur-clad neighbors of the north and our summer-clad neighbors of the south are equally welcome. So standing in the heart of the great Republic, your charity shall touch the ice-cold coast of the Arctic sea and the sun-bright shores of the tropics. This "American Forestry Congress," by a joint resolution of the Illinois Legislature, will meet in your Hall of Representatives, September 14, 15 and 16, 1887, to which you are all invited.

With your permission, I wish to say that I would like to name some of the noble and unselfish men who have labored and are still laboring in this worthy cause.

But, Mr. President, the sad history of mankind admonishes us that it is not the time to praise men while living. We wait the seal of death to make sacred our eulogies. I may, then, be permitted to name one whose life is beyond reproach — who toiled for the adornment of God's beautiful earth; who loved trees with the passion that the maiden does the flower; a Quaker of the orthodox stamp by birth; in early life a practicing physician in the city of Cincinnati; in maturer years and a ripe and scholarly old age, an unpaid and unselfish toiler for the planting of forests, and the conservation of the groves planted by the God of Nature. I mean Dr. John A. Warder, of Cincinnati, Ohio. If, as we all hope, a new era is to dawn on this country of ours, we must conserve her natural forces. We must incorporate forestry planting and forestry reservation in the curriculum of our public schools. I have little expectation from our agricultural colleges. In them, most emphatically, the science and practice of forestry ought to be taught. But since they have eliminated the term "*Industrial*" from their cognomen, and seem to think labor a disgrace, we may dismiss all our hopes from that source, and fall back on the family, the farmer, the horticulturist, and the common schools. I insist, Mr. President, that 20 per cent. of our State should be timber lands.

C. N. Dennis — I supposed that Mr. Minier was better posted about the change of the name of the University of Illinois. I know they do not shrink from work or responsibility, but the object in striking out the word "Industrial," was that it might be distinguished from reform schools.

Prof. Burrill — I may say — and I know it from daily association with them — that there isn't a man at the University that is not proud of the industrial features. Look at the catalogue. Agriculture comes first. The professor of agriculture receives the largest salary. I should like to send a catalogue to any one who would like to see what we are doing, or to answer any questions.

E. R. Brown — I think this explanation will be very satisfactory, for I think a good many of us never fully understood this matter.

A. L. Hay — A very learned man in Jacksonville says he don't think trees have anything to do with the rainfall. I believe that the hedges, fruit and ornamental trees planted around our farms, more than counter-balance the original forests.

Dr. Humphrey — If Illinois was one-tenth forest, distributed over the State, the rainfall would be larger. A low cloud is attracted to a timber belt. Trees make a difference with local showers. But if we had no trees at all we should still have rain. There is more timber in Illinois than thirty years ago, but it is not worth as much. Can Mr. Minier give us a list of trees to plant for timber?

G. W. Minier — For a list of trees to plant in Illinois, the Black Walnut stands first. The Burr Oak, White Oak, White Ash, Hard Maple, White Walnut and Linden are also good.

Dr. Lobaugh — The sugar maple grows very slowly, and if it breaks, never recovers entirely. I like the Hackberry very much for a shade or ornamental tree.

Dr. Hall — I never knew a Hard Maple to break.

H. M. Dunlap — I don't think anything has been recommended that will do for farmers. Is there anything that we can plant for posts? How will the European Larch do for this purpose? I have some that have been in the ground four years, and show no signs of decay. How about the Hardy Catalpa? There should be a windbreak around every farm, but I don't think farmers can afford to devote twenty per cent. of their farms to forest trees.

Mr. Minier — The Hardy Catalpa is highly recommended for posts, but not one in a thousand know anything about it. If we can have the Red Cedar it is the best. European Larch is the only foreign tree that will do well in this country. I do not know how they will do for posts. I think Mr. Dunlap has probably given them as fair a trial as anyone.

Mrs. Meade — I think we should plant trees for future generations.

Dr. Lobaugh — Plant Osage Orange for posts; there is nothing better.

G. W. Minier — You are all most cordially invited to attend the meeting of the American Forestry Congress to be held in Springfield, in September.

Adjourned to 8 P. M.

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## WEDNESDAY EVENING.

Song — "John on the Island."

While visiting in St. Augustine, a year or two ago, Mr. Brown attended an old church, (supposed to be the oldest in the United States) and heard this wild, weird song, sung by the colored people, and was so impressed with its wild, sweet, strains, that he was able to reproduce it from memory, after returning home. The Society feels under special obligations to Mr. Brown, and the Glee Club for the pleasure they afforded by its rendition.—SECRETARY.

### SUCCESSES AND FAILURES OF SMALL FRUIT GROWING IN ILLINOIS.

BY R. W. HUNT, GALESBURG.

*Mr. President, Ladies and Gentlemen of the*
*Central Illinois Horticultural Society.*

Horticulture, in the broad acceptation of the term, in the present liberal age, seems to embrace every employment that tickles Mother Earth with plow or cultivator, hoe or digging-fork, seed-drill or planter; the culture of large and small fruits, vegetables, trees, shrubs and flowers, the making and care of lawns, and landscape gardening in all its details.

In proof of this, I have only to refer you to the programme of this present meeting of your Society. It would seem, therefore, that we have pabulum for much thought, work for many hands; experiences enough, should we relate them, to fill a very large book, enquiries enough as to the whys and wherefores, to duplicate the same, and don't knows enough to make a very formidable appendix. And I doubt not the knowledge of these facts has induced you to call upon so many for their views, assigning to each a particular subject.

I have accepted the task of presenting a few thoughts upon the successes and failures of small fruit culture, including the marketing of the same.

I believe I voice the sentiment of every member of this Society when I say there has been no occupation followed by man from the first gardener, Adam, down to those present here to-day, that has the fascination that horticulture has. And I place the growing of small fruits at the front in this respect. None other can compare with it, and I verily believe no other one has proven such an ignis-fatuus, leading its votaries on! on!! with increasing headlong haste into the slough of despond and quicksands of financial ruin.

Have you any doubt of the correctness of this assertion? If you have, run over the long list of names within your own personal knowledge, and tell what proportion of them have grown rich in the small fruit business alone. How many have even made a good living and legal interest on capital invested? And should I put the question to those present, I believe "every one with one accord would cry out, not I! not I!!" Who then have been successful? Those who have either originated or purchased of the originators the "entire stock" of some new variety of the small fruit, which, with ordinary culture, has scarcely a distinguishing characteristic from many of the ordinary kinds already in cultivation, but which, by being given the best possible cultivation and care, even to the thinning of fruit, have produced fruit of enormous size and great beauty. And been heralded to the horticultural world as the *sine qua non* of its class. "Being the largest, handsomest, hardiest, firmest, self-fertilizing, and most productive of all. Supply limited. Order at once. Only $2, $3 or $5 per dozen." These are the few who have made money from small fruits.

Who have lost? Nine-tenths of those whose infatuation led them to purchase largely at these prices, to find too late that they have bought wisdom but too dearly. The "largest" being confined to one or two to the plant, with all the rest small. The "handsomest," to a large proportion of coxcomb berries, if strawberries. The "hardiest," to the winter-killed or burned out in summer. The "firmest," to soft, juicy berries, too soft to be trusted away from home. The "most productive of all," to a very moderate bearer. The "self-fertilizing," to the most distinctly pistilate, worthless without other varieties to fertilize. These men are out the money paid for plants, the time taken to plant and cultivate the ground they occupy and two years of anxious waiting. But then they have the experience and don't have to pay for picking.

These are not all the failures. Many have survived all the above enumerated disasters to fail in other ways. To illustrate, let us take our Illinois small-fruit-growers, the largest of which are along the line of the Illinois Central Railroad. How many of them have made fortunes? How much have any of them made

during the last three years? How much can they make when their berries are sold on the Chicago market for five or six cents per box. after paying three-fourths of one cent per box for boxes and crates, two cents per box for picking, express charges and commission? And when they bring more it is when they have but few to sell. It seems to me this is all wrong. I believe the grower should realize on an average, the season through, ten cents per box. This would probably net themfive cents per box.

Not much, I assure you. How can this result be obtained? I should say, grow less, that the market may not be glutted. Grow early and late varieties, and, if needs be, keep some back by covering and leaving covered as long as possible. Grow only those that stand up well in the boxes. This may drive you back to the old, despised, Wilson's Albany seedling. A berry that, in my estimation, has no value but its shipping quality. I pity those who would have them to eat; but, then, I pity those who eat only shipped berries of any kind. What do they know about the luscious flavor of home-grown fruits of any kind? This may be what Gray (not our own D. H. Gray) had reference to when he said, "Where ignorance is bliss, 'tis folly to be wise." But may the good Lord deliver us from that *particular* strain of ignorance.

Still, it may be possible that even those poor souls may have tastes so trained as to distinguish between the Wilson and better sorts, but I doubt it, for I have heard so many say, "Oh, a strawberry is a strawberry. No difference." But you watch them when they buy a box of berries, they invariably make a stagger at selection, but always go for the largest, forgetting that, as a rule, the best goods are sold in the smallest packages. And either in vegetables or fruits, size is had at the expense of quality.

Let us then endeavor to send them their berries by the nearest and most expeditious routes, that they may have a little idea of fresh fruit.

With all the tooting of horns, with all the photographs and chromos, all the wasting of printer's ink during the last twenty-five or thirty years, I believe, with the exception of the Crescent Seedling, we have nothing to compare with the Wilson's Albany for shipping long distances. This is not pleasant to think of, but 'tis too true. What then shall we do? Go back a quarter of a century and take the Wilson, and be content therewith, as are the Michiganders, or grow less and ship direct to points of consumption?

I have often wondered, when seeing strawberries on sale at Galesburg, with the name of some Cobden or Centralia fruit-grower stamped upon the case, and followed by the name of some commission man of Chicago, why they could not have been shipped across the country, reaching the consumers in a few hours, instead of going two or three times as far around to Chicago, there to be hustled from the express car to the commission house, to lay there over a day, and

perhaps a night, then to be carted to some other depot, to be tumbled and tusseled all the way to Galesburg, where, in hot weather, they arrive in that conglomerate condition that can fill an order for either *jam*, *jelly* or *wine*.

I presume you are ready to answer me by hurling a whole train of refrigerator cars at me as a knock-down argument. All right. Give me two or three trains, and I will see that they are distributed over other routes than the Illinois Central Railroad, if needed. But I opine that if berries were shipped by other routes direct to the consumers they would not need refrigerators, but if they did, other roads would furnish them.

Let me suggest that the fruit-growers along the line of the Illinois Central unite in paying the expenses of a good, active man to go, just before the season of shipping begins, to the different towns throughout the northwestern portion of the State and make arrangements with the grocerymen and dealers to handle a certain number of crates per day through the season, and ship direct to them. I believe this would be more satisfactory to all but Chicago commission men. Surely something ought to be done, for all the charms and pleasures of the business combined will not keep the pot boiling nor make plethoric the purse, both of which are about as essential to the horticulturalist as any other class of men, and they are surely as deserving.

Then put your heads together, brethren, and see if you can't evolve some method by which the growing of small fruits may be made remunerative. Cut loose from old fogyism; abandon the line of the Illinois Central Railroad as the only base of supplies; invade the enemy's country and forage upon him direct; send out your scouts and set your picket lines; and if there are none brave enough to come out to battle, send a flag of truce into every railroad station and make terms based upon fair dealing — you to furnish good fruit, in full-sized quarts or pints, in good condition; they to pay a fair price for them. Try this, and I believe we will soon see the end of rotten berries sent out of Chicago all over the country, at a loss to the grower, at a loss to the consumers, and a profit only to commission men.

Prof. Burrill — This plan of keeping back strawberries by mulching has not, as far as I have observed, been a success. Has any one present had any experience?

Dr. Hall — In reference to shipping direct to the consumer, Mr. Browne, of Alton, tells me that he can ship to Chicago and back cheaper than to have the fruit put off at points along the road.

A. L. Hay — I have had strawberries a week earlier by mulching. I don't think you can keep them back in that way, and don't think we should keep them back, but let them ripen as early as possible before the drouth comes on.

Prof. Burrill — I have about come to the conclusion that on land that does not throw out the plants badly, it is better to leave the mulch off.

By request, Miss Jennie Brown, of Galva, entertained the Society, for a short time, with an interesting and well rendered recitation, "Kentucky Belle."

## THE GEOLOGY OF SOILS.

BY PROF. C. W. ROLFE, CHAMPAIGN.

The time allotted to this paper will make it necessary to exclude all matters pertaining to artificial fertilization, to the admixture of humus, or to the mechanical condition of the soil, and to limit what is said strictly to its origin and inherent sources of fertility.

By causing seeds to germinate in pure water, and then adding known quantities of various mineral substances, vegetable physiologists have shown that, while many mineral matters which the plant takes up are of no particular value, others are as essential to its growth, as water or sunlight; that these minerals are such as are not brought to the soil by outside agencies, but are liberated within it, by chemical changes among its constituents, and that the plant can make no use of them until they are brought to it in solution.

With these facts before us, I am sure no excuse will be thought necessary for bringing before a body of agriculturists some thoughts upon the origin and properties of soils, or the rocks whose decomposition produce them.

Soils are broken down rocks, and hence any inherent resources of fertility the soils may possess must have existed in, and been derived from the rocks which formed them. For this reason our study should begin with the origin of the rocks themselves. Let me ask you, then, to go back with me to the time when there was no soil. The earth, existing once as a great drop of molten matter, has contracted, under the influence of its molecular forces until solidification, beginning at the center, has reached the surface. The continents are outlined as elevated plateaus, and the ocean basins as broad lowlands, but no drop of water had fallen, and, of course, no life had been created. The entire surface of the earth was one black and dreary waste of hard, dry, barren, rock, everywhere nearly the same in color and composition.

This geologists, or better geophysicist believe is a true picture of the earth at that time.

What was this primitive rock which covered the whole earth and furnished the material for all other kinds? A few facts from chemical geology will help me to answer the question.

If a quantity of pure white sand is mixed with an equal weight of carbonate of soda, and gradually heated, we will see that, before

the fusing point is reached, a large quantity of carbonic gas is given off, after which the fusion goes on quietly. The explanation of the reaction is this:

The silica or silicic acid of which the sand is composed, is able, with the aid of intense heat, to take from the carbonic acid, the soda which it holds in combination, and unite with it, forming a glassy silicate of soda, and leaving the carbonic acid free, as a gas. If, instead of carbonate of soda, we had used the carbonate of any of the alkalis or alkaline earths, the oxides of the metals, or compounds of any of these, with the stronger acids, the result, with proper variations in manipulation, would have been the same, viz.: the formation of a glassy silicate, and the liberation of the acid constituent. Experiments like these have led to the enunciation of the following law: "At elevated temperatures, silicate acid displaces all other acids." Now, the conditions under which our primitive rocks were formed, were certainly such as would bring this law into operation, and all their mineral bases would have been converted into silicate. This rock, then, must have corresponded closely with our basalts, trachytes and obsidians, which need but time, heat and pressure, to convert them into into granites, syenites and greenstones.

We see, then, that in this primitive, crystalline rock, all those substances which go to make other kinds of rock, and are destined, in time, to become the nutrient, as well as the supporting elements of our soils, are locked up as silicates, and must be loosed from their bonds before they can be utilized.

While a series of experiments, conducted at elevated temperatures, has shown that, under these conditions, silicic acid has power to displace all other acids, a parallel series, conducted at lower temperatures, has shown, that "at ordinary temperatures silicic acid is displaced by other acids," and notably, by carbonic acid.

The earth having cooled to a point which would permit the condensation of moisture in its atmosphere, rain fell in torrents, carrying with it various corrosive gases absorbed in its descent. This water, falling upon and sinking into the rocks, is able, in consonance with the law just stated, to break up the more unstable silicates, carrying a portion away in solution, and leaving the remainder as a loose powder, readily washed of by the water which flows over the surface.

It has been proven by experience that the carrying power of water varies as the sixth power of its velocity; that is, if the current of a stream be doubled, its carrying power will be increased sixty-four fold. From this it can be seen that, if a current, bearing sediment, meets with opposition, it will quickly deposit the coarsest particles in its load, then those which are finer, carrying its finest portions farthest from the shore. So it is that, when the material picked up from the surface of the rocks, and carried through creeks and rivers, meets the waters of the ocean, it is assorted into coarser and finer gravels, coarser and finer sands, and clays.

That portion, the smaller portion, of the broken-down rocks, which is carried away in solution, sinks deeper into the rocks, and then does wondrous work. It breaks down some of the silicates, and fills their places with very different substances, formed by the union of the base of the silicate with another acid. It abstracts from a compound silicate a single constituent, and replaces it with another. It enters into the structure of a mineral, and, without in the least altering its composition, it so modifies the action of the crystalline forces as to effect a material change of form; or, escaping into some fissure, it deposits on its sides a portion of its load, and changes the fissure into a mineral vein. But, no matter what its underground work might have been, it all, sooner or later, finds its way to the surface, and is carried through creeks and rivers to the ocean. There some portions are taken up by living forms, and converted into coral sands, shell beds, etc., while the remainder meets with conditions which cause its precipitation. This precipitated material, coming in contact with the gravels, sands and clays formed by running water, and the coral sands, shell beds, etc., consolidates them into conglomerates, grits, sandstones, shales and limestones. In this way, water, aided by such gases as came within its reach, was able to break down the silicates of the crystalline rock, and from their debris to form all the different kinds of which we know anything. Water, acting through millions of years, has covered the black and ugly primitive rock with a beautiful variegated mantle.

But no sooner were the rocks so formed elevated above the surface of the ocean by the contractile forces of the earth than rain-water began its destructive work upon them also. Working its way into their pores, it broke up the cement which held their particles together, dissolving some, and leaving the others in the loose condition with which we are familiar in our soils. Now, as the soils, so formed, are simply disintegrated particles of the underlying rocks, and as, owing to the instability of the currents which produced them, the composition of the rocks varies through infinite gradations, it is easy to account for the variety of soils. Again, as the water which sinks into the rocks has been shown to be the active agent in the production of soils, so that which runs over their surface is continually taking up their particles and bearing them away. If the conditions favor such action, the soil will be carried away as fast as formed, and though in more sheltered localities it accumulates, — sometimes to the depth of several feet, — still this denuding action is steadily going on, and the underground forces must be ever active to keep it intact. Nor is this denudation to be looked upon in most cases as an evil, for the ingredients which enter most largely into the composition of the soil are not those which are most needed for the nourishment of the plant, and, if the soil were to remain intact, this nutritive material, existing, as it does, in relatively small amount, would soon disappear from that portion of the soil which is

within reach of the roots; but, as the surface is continually wasting, the roots are enabled to penetrate deeper and deeper and draw their supplies from the fresher soil beneath.

But all soils are not formed like those of which we have been speaking — by the decomposition of the rocks which immediately underlie them. Many of our most fertile ones have been transported long distances.

A good example of soils of this class is found in our bottom lands. These owe their wonderful fertility not alone to the quantity of humus they contain, or to their mechanical condition, but largely to the fact that their materials are gathered from a wide expanse of country. No river flows through its entire length over the same kind of rock, but its bed usually contains many varieties, and, as each of them contributes its part, the soil of these bottom lands must contain more elements of fertility than ordinary soils formed in situ.

Another example of transported soils is our glacial drift. Glaciers have their origin in immense snow-fields, which cover large elevated plateaus of crystalline rocks. These plateaus, hemmed in on every side as they are by highlands, form great catch-basins, in which the snows of successive seasons accumulate, until the great weight of the mass forces it out through some pass or opening in its side and down into the valley below. Their weight, and the irresistible force that drives them forward, cause them to break off and grind up large quantities of these crystalline rocks, and carrying them down the mountain side, to deposit them at the lower levels, where the glacier melts. This is the course of glacial action as we see it exemplified to-day in the Alps, the Scandinavian mountains or in our own coast range, but in former times, during the glacial epoch, the great British-American plateau, elevated then much higher than now, formed a catch-basin from which a glacial sheet spread southward nearly to the latitude of Cairo. This ice sheet, as it retreated, left behind the material which it had gathered in its course, covering the prairies of Illinois with a coating of ground crystalline rock, often one hundred feet in thickness. Now it has been shown that the crystalline rocks contain the elements of all others combined, and hence this soil must have in it everything that can be needed by any plant. This soil differs again from others in that it was produced by grinding rather than chemical decomposition, and contains much undecomposed silicate. These silicates are protected from decomposition by the fact that clay is at the same time a great absorber and a poor transmitter of water, but they break up readily whenever means are employed which cause water to pass through the soil more freely. It is for this reason that the soil of our prairies is, when properly cultivated, practically inexhaustible.

## THURSDAY MORNING.

Rev. Butcher, of the Congregation Church of Elmwood, opened the session with prayer.

President — If we follow our program, the first thing in order will be the election of officers for the ensuing year.

H. M. Dunlap — I moved that the subject of the change in the Constitution be called up first. Motion carried,

H. H. Dunlap — I moved that the words "one dollar," as they occur in the third line of Art. III. in the Constitution, be stricken out.

A roll call of the Society was taken, and all were in favor of the amendment.

H. M. Dunlap offered the following resolution:

*Resolved*, That the published list of members of the Central Society consist of the members of local societies present at this meeting and those who pay the membership fee of this Society.

The resolution was adopted.

H. M. Dunlap offered the following resolution:

*Resolved*, That Prof. S. W. Parr, G. W. Rolfe, Mrs. R. H. Meade, Mrs. A. E. Connable, L. R. Bryant and Clarence M. Weed be made honorary members of this Society.

The resolution was adopted.

Dr. Hall — I move we take up the question of locating the next meeting before we proceed to the election of officers. Motion adopted.

Dr. Hall — I now invite this Society to hold its next annual meeting in Champaign. We will give you a cordial welcome, and I think we can have a very pleasant meeting.

Mr. Dunlap — We shall be glad to have you come, but cannot promise a very large local attendance, but will do all we can to make your visit pleasant.

Mr. Dennis — I hope the Society will bear in mind that you have a standing invitation to come to Hamilton.

Mr. Hammond — The I. B. & W. Railway has always shown an unwillingness to grant us any favors. I will therefore move that we hold our next meeting in Champaign, provided the I. B. & W. Railway grants the usual excursion rates. Motion adopted.

The Society now proceeded to the election of officers, which resulted as follows:

*President* — C. N. Dennis, Hamilton.

*First Vice-President* — D. H. Gray, Elmwood.

*Second Vice-President* — A. L. Hay, Jacksonville.

*Third Vice-President* — Prof. T. J. Burrill, Champaign.

*Secretary* — A. C. Hammond, Warsaw.

*Assistant Secretary* — Miss Bessie M. Nash, Warsaw.

*Treasurer* — Dr. Lyman Hall, Champaign.

President — I will appoint Dr. Humphrey, of Galesburg, and Mr. Gibbs, of Elmwood, a Committee on Final Resolutions.

In response to the President's call, the Glee Club now sang "Woodman, Spare That Tree," in a manner that was both enjoyed and appreciated by the audience.

The Secretary now read a letter from Mr. O. B. Galusha, expressing his interest in the work and his regrets that ill-health made it impossible for him to attend the meeting.

On motion, the Secretary was instructed to send the greetings of the Society to Mr. Galusha.

## REPORT OF THE COMMITTEE ON THE SECRETARY'S AND TREASURER'S REPORT.

*To the Central Illinois Horticultural Society*:

*Gentlemen:*—We, the undersigned, your committee appointed to examine the reports of the Secretary and Treasurer, have examined the same and compared them with the vouchers, and find them correct.

A. G. Humphrey,
C. N. Dennis,
*Committee.*

## "STRAWBERRY BUTTONS."

BY D. H. GRAY, ELMWOOD.

Buttons, where they are needed, may be desirable, and may be of beautiful designs. Things that are useful are often worn as ornaments, but a strawberry button is a failure, both as to its usefulness and beauty. An abortive attempt at a strawberry, misshapen and bitter, it is, in no way, the aim of the grower, nor is it the delight of the consumer. How shall we get perfectly formed berries instead of buttons? I ask this question of this intelligent body of horticulturists, for a practical answer. I am ready to offer as a reward, to the one who discovers how to always grow perfectly formed berries, the great satisfaction of growing perfectly formed fruit—a motive sufficient to call forth our best endeavors.

Guessing will not find it, however shrewd we may be in this Yankee talent. Perhaps the scientific would search carefully for the cause, or causes, of buttons, and then seek the removal of those causes. I am quite sure of one thing, that is, I can succeed in growing buttons, by rule, and rarely, if ever fail. One day a gentleman, an amateur grower, requested me to go with him to see his strawberry bed, which covered nearly one-half an acre of ground. I knew by his countenance, and the rubbing of his hands, that he expected some compliments. The bed was composed of Crescent Seedlings, with a few Downings interspersed. They had made vigorous growth and showed immense foliage; they were in matted rows, the plants crowding one another, in rows two feet or more in width. It was in flowering time, and I was sure he had hit exactly the unfailing rule for growing buttons. My silence may have effected my countenance, for he drew near and, looking into my eyes, most cruelly asked me what I thought of his prospect. I told him his plants looked well. I did not wish to pain him, since it was too late to remedy the evil. This is one cause of buttons on Crescents — too many plants crowded together in the row. I have not been in the business long enough to see this cause ever fail.

But it may be asked, "Is there not more than one cause for buttons in the overcrowded row of plants?" There may be; but do not make the mistake of supposing that I am aiming to settle this great question to-day. It is not my aim, but to have the honor of opening the question of how to grow perfect berries, and to hear your opinions, that I may hive up wisdom for future use. The question suggested is quite pertinent, and deserves an answer. There are several ways in which this and other causes may be tested. Supposing we plant a Crescent plant in good soil, and keep the soil in a friable condition, allowing one square foot to the plant. What will it produce if separated from all other plants, berries or buttons? My observation leads me to believe that it will produce, at least, berries

three times out of four. But this exception, one year in four, or whatever the exception may be, leads us to look for another cause. The pollen in the Crescent is not advantageously situated, and it may be that unfavorable weather at flowering time may prevent the fertilization of the seeds. To obviate this, we plant a variety near by that grows long stamens and is abundantly supplied with pollen. This may reduce the chance of buttons in some degree, but we find where plants are properly situated, as described, buttons are occasionally formed in abundance. So we must infer that there are causes not yet accounted for. Sometimes, when pistils turn brown before the pollen of the flower is ripe, we find severed roots the cause. If the breaking of a part of the roots occurs after the berry has been pollenized, small but perfectly formed fruit would result; but occurring as it does before the flower is blown, it enfeebles the pistils so that only a partial fertilization of seeds takes place. Many seeds not fertilized as the pulp of the fruit, will not grow to nourish a dead seed, but grows to support those containing germinal life. It gives the irregular form to the berry, which is commonly called "button."

The roots are severed by what is called heaving — the expansion of the soil while freezing. This severing of the roots does not often occur with the Crescent, as this plant has a long root stem of uniform thickness, yet occasionally I have found its roots broken, but not to that degree that would be the destruction of the plant. The Downing, Jewell, and other plants of short root stems, with large crown or group of crowns, are often destroyed altogether by the heaving of the soil by freezing. But when the Sharpless, Downing, or any of our strong staminate sorts, are root-broken enough to kill them, they are almost sure to form buttons, and the lack of vital force shows itself first in the color of the pistils, and not in the stamens or the pollen. I have noticed a fourth cause, not so common to the Crescent or deep-rooting varieties as to the plants of stool habit, yet I have thought the same cause may be against perfect form of fruit on the Crescent to a less degree. Several rows of plants passed over a slight rise of ground, with their ends resting in low, flat land, heavily mulched. The ends of the rows produced buttons, while the other part produced the perfect form of fruit. It was not caused by severing a portion of the roots, as this did not occur, but was caused by a lack of active vitality in the plant just before and at flowering time. The season for flowering had come, but the side rootlets or feeders for the season had been kept back by the cold condition of the soil, but large buttons were the result, as the plants gained great vigor after flowering time. Another cause I have noticed, which is confined to but few varieties, the Sharpless giving the best example, a very large ovary, with light wrapping of calyx when in the bud. If the weather is unfavorable, by cause of cold, the tender pistils are often impaired in the bud, to the destruction of the fruit altogether. Sometimes partial and de-

formed fruit is formed. When not injured, the plant will give fruit of good form.

I will close here, believing that there are other causes not yet noted. Perhaps Prof. Forbes will convince us that the Thrips, when in abundance upon the flower, are a cause of malformation of the berry. I await his paper with much interest. I also believe that he who would produce perfectly formed strawberries must take intelligent notice of the cause of "strawberry buttons."

## HARD PROBLEMS IN HORTICULTURE.

BY C. N. DENNIS, HAMILTON.

Excessive drouth, or wet, blight, borers, canker-worms, curculio, codling moths, leaf-rollers, aphis, mice, hard winters, hail-storms, cyclones, etc., are but the A, B, C of horticultural troubles. For some of these there are preventives or remedies, and for some none. Drouth may be alleviated by a thorough culture. In the preparation of the ground for any kind of fruit, I would plow deeply, and run a subsoil plow below that (not throwing the subsoil on top), thoroughly pulverizing or loosening the ground from twelve to sixteen inches deep. Then give thorough and frequent stirring of the ground, forming what is termed by some a "dust mulch."

This deep loosening of the soil allows the roots to go deeper and avoid the surface heat. Again, in a wet season subsoiling allows a surplus of water to escape quicker to tile or natural outlet.

For blight, when thoroughly understood, that is, whether it is animal or vegetable, bacteria or vegetable fungoid, we *may* find a preventive in Paris-green or arsenic, or in lime or sulphur. Borers may be prevented or driven off by thorough cultivation and some wash, or killed in infancy by care and labor. Mice will seldom trouble orchards or trees unless a cover of trash is on the ground; and, if found to be numerous, poisoned grain, placed under some cornstalks or straw, will catch many of them. Canker-worms may be killed by spraying, and so may the codling moth. But the curculio may prove to be proof against this, and require to be jarred off and killed. Hail-storms and cyclones are among the unmanageables, and the only way I know of is to stay out of their way.

Severe winters, I fear, have to be bear more than their share of the blame in the hard problems. To illustrate, an apple tree is planted (perhaps in poorly prepared ground); it makes out to live the first year, and is exposed to an excessive hard winter, and dies. This would be winter-killed. Again, poorly prepared ground, mangled roots thrust into a little hole not half big enough to receive them properly, and the ground allowed to bake, or if cultivated, the tree is barked by the singletree, and this in the hard winter dies. *It is winter-killed.* Again, if the tree is properly handled, well planted

and makes a good start, and the ground is cultivated in corn from two to five years, is sowed to clover or timothy, which is mowed in June, and the ground exposed to the full force of the summer's sun, and as soon as the grass starts again is pastured and tramped; this repeated year after year till the tree comes into bearing. A favorable season overloads it with fruit, and in its starved and exhausted condition, the hard winter kills it (or rather it was winter-killed in summer). It would be strange if it did not die. The only wonder is that it did not die before. And I repeat here what I have said before, that there are, and will be, more trees killed in Central Illinois by improper handling, poor planting, abuse, starvation, insects and sod than ever have or ever will be by hard winters.

Having enumerated some of the harder problems of the amateur horticulturist who grows for his own use, let us see how it is with the professional and commercial one. Having encountered all the ills spoken of and many more, he has at last produced an abundant crop of fruit. Here his trouble just begins; having headed off the codling moth and curculio, next come the birds, and if too bad you can shoot them. Then the boys come. What will you do, shoot them? No; they are too valuable for that; What then? Why, that is too hard for me. After the boys comes the gathering, and how to get this done properly is a problem requiring much study, labor and anxiety, and can be solved only by faithful study and care in each and every individual case. But having the berries in the box, the apples in the barrel, and the peaches and grapes in the basket, then comes the problem how to dispose of them so as to pay cost and leave a fair margin for profit. The Secretary did not require me to solve all these problems, and I leave this to some of those who sold 24-quart cases of strawberries in Chicago at ninety cents per case, apples seventy cents per barrel, etc. There must evidently be some way out for the same parties keep right along, even if they do have to sell at from fifty to seventy-five per cent. of the cost of their fruit. Their success lies in perseverance. I believe that with the rich soil of Central Illinois thoroughly cultivated, properly planted with a well-selected assortment of fruit, the same well cared for, the fruit carefully picked and assorted, and all pushed with *energy* and *perseverance*, success will be insured, and success solves even the hardest horticultural problem.

Dr. Hall — I am satisfied that we do not always get honest returns for our fruit. I shipped apples to Chicago, and the sale was reported at $1.25 to $1.75 when I knew that the same quality of apples were selling much higher.

Mrs. Meade — The farmers and horticulturists of the country are largely in the majority, and if they would work together and demand their rights, they would not so often be made the victims of middlemen and sharpers.

A. L. Hay—Is there not some remedy for over-production, and gluts in the market? We took a barrel of apples out of the refrigerator at the Asylum, a few days ago and found it in good condition. Even strawberries can be kept several weeks in this manner.

H. M. Dunlap — We certainly have our grievances, but we must seek reasonable remedies. When I send choice fruit to market I always get fair prices, often above the quotations. Commission men cannot help the gluts and depressions in the market, and if we could manage to hold back a portion of our fruit until it was wanted, we could help ourselves and the commission men at the same time. I think there are some honest, and a great many dishonest men on South Water Street.

W. J. Humphreys — I wish to ask Mr. Dennis if he would now advise planting apple trees, and blackberries between the rows?

Mr. Dennis — Yes ; I have done it, and expect to make it a success. I planted apple trees two rods apart, and between the rows a row of peach trees, and between the apple and peach trees I planted blackberries and raspberries. By high manuring and thorough cultivation, I expect to get good results from this piece of land.

Mr. Phelps — Wont your trees winter-kill if so highly manured.

C. N. Dennis — I don't think apple trees ever winter-kill unless there is some other cause behind the cold. Manuring and cultivating may cause late growth, which unfits a tree to endure a low temperature.

Mr. Phelps — I think our trees will endure more cold if not grown too fast. Our soil is rich, and trees, in favorable seasons, make a large growth, which the succeeding winter, if severe, is almost sure to kill.

A. C. Hammond — I cannot indorse the opinion of these gentlemen, but have found that rich, well-cultivated soil will retain moisture during the most severe drouth, which will enable trees to complete their growth at the proper time, thus obviating all danger of winter-killing.

Prof. Burrill — I don't approve of the plan of growing different kinds of fruit together, as it is difficult to give the proper cultiva-

tion. The cheap plan of growing strawberries is in matted rows, which cannot be done among trees. I have known this plan to be tried; but it has always resulted unsatisfactorily.

A Member — Will you explain how you manage your strawberries.

Prof. Burrill — We plant three and one-half feet apart, and as soon as the fruit is gathered, plow up all but narrow strips, six or seven inches wide, and harrow thoroughly. A patch at the University was accidentally burned over, with no bad result.

G. W. Minier — One of my boys accidentally burned the mulch from my strawberry patch, which taught me that ashes are the best fertilizer that can be applied. Don't be afraid to harrow; you may may think your patch is ruined, but it will come out all right.

## THE STRAWBERRY MIDGET,

BY CLARENCE M. WEED, CHAMPAIGN.

About the middle of last May there began to appear in the local papers of some of the principal strawberry-growing regions of Illinois, accounts of a minute "midget" that was swarming in the strawberry blossoms, and was supposed to be blighting the fruit. The insect was generally believed to be entirely new, and sensational accounts of the injury done by it were seen on all sides. Some observers saw the insects in raspberry and blackberry blossoms, and were apprehensive that these also would be injured.

The first accurate account of the insect and its injury was published, I believe, in the issue of the *Centralia Sentinel* for May, by Dr. Diehl, of that city. The article was accompanied by a very recognizable illustration and description of the pest, but its name and family relations were not given. A portion of this article and a corroboratory letter from Mr. Jabez Webster were published in the issue of the *Prairie Farmer* for May 28, where the pest was editorially identified as a true Thrip. The next contribution to our knowledge of the subject was a letter from Prof. Forbes, published in the *Centralia Sentinel* the latter part of May; (re-published in the *Prairie Farmer* June 4), in which the insect was specifically identified as the wheat Thrips (*Thrips tritici*, Fitch), and a general account of the habits of the family was given. Various other minor mentions of the subject might be here referred to, but limited space does not permit.

The family (*Thripidæ*) to which this strawberry midget belongs, is a peculiar one, which has as yet been very little studied in this country. In Europe, something over forty species have been de-

scribed, but American entomologists have so far recognized only about one-third this number, though no doubt there are many others not yet described. The *Thripidæ* are minute, active insects, mostly less than one-tenth of an inch long, having delicately-fringed wings folded flat upon the back, with free mouth parts, by means of which they can both bite and suck, and two-jointed tarsi without claws. Some authors have placed them in a distinct order—*Thyramoptera*—while others have placed them among the *Hemiptera*, *Orthoptera* and *Pseudo-Neuroptera*. The species in question was described in 1855 by Dr. Asa Fitch, at that time State Entomologist of New York, as *Thrips tritici*, or the wheat Thrips, so called because it was first secured from wheat blossoms in Wisconsin. It is yellow in color, with the thorax tinted with orange, and the antennæ with dusky annulations. The female is larger than the male, the wings in the latter reaching beyond the abdomen, while in the former they do not extend to the tip. The wheat Thrips occur abundantly throughout the season on blossoms of clover, wisteria, apple, pear, raspberry, blackberry and many other plants. Its life history has not been fully traced, but probably is similar to that of related species which are known to pass the winter as adults, and deposit their eggs on the surfaces of the leaves in April or May. There are probably many broods each season.

The food habits of Thrips have not been very thoroughly studied in this country, but from the scanty observations which have been recorded, it appears that some species are carnivorous and others vegetable feeders. To the former class belong specimens found by Dr. Riley to feed upon the red spider and grape Phylloxera, and to the latter the species found by Fitch, Osborne, Pergande and others, to infest fruit blossoms. The European species seem to be mostly vegetable feeders, for Westwood writes of them: "These insects are found upon various plants, sometimes swarming in immense profusion on various kinds of flowers, especially the large white hedge convolvulus. They are very agile, and often leap to a considerable distance when disturbed. They feed upon the juices of plants, and are often extremely injurious, especially in hothouses and vineyards, the leaves upon which they reside being marked all over with small, decayed patches. They also especially infest melons, cucumbers, kidney beans, etc. One species infests the wheat, sometimes to a mischievous extent. This species was observed by Mr. Kirby between the internal valves of the corolla and the grain, and taking its station in the furrow of the seed, in the bottom of which it seems to fix its rostrum, and by sapping its moisture, makes it shrink up and become what the farmers call prongled."

Prof. Herbert Osborne states that he has found what was probably the same species as our strawberry midget in apple blossoms, doing serious injury to the style of the pistils. "A careful examina-

tion of a number of unopened buds revealed the fact that in eighty per cent. of them the style had been more or less injured by biting and puncturing. In the majority of the buds examined the style seemed to be injured more than any other part of the blossom." He relates that he "became convinced that they were doing much injury by preventing fertilization, as their injuries to the tender styles would cut off all communication between the stigma and the ovary."

The injury to the strawberry blossom is very similar to that of the apple just described. I examined hundreds of blossoms at Normal, and found that those in which the Thrips were swarming almost invariably had a large proportion of the pistils seriously injured, the styles being usually the part attacked. The latter appeared more or less gnawed and discolored shortly after the injury, and soon became black and dead. Of course the effect of this prevention of fertilization is to dwarf or blight the berry, as the receptacle does not develop beneath non-fertilized seeds. Probably much more damage was attributed to the strawberry midget than it really did. The effect of its injury is much the same as might result from half a dozen other causes, and wherever people noticed blighted berries and discovered a few Thrips present (an easy task, as they can be found almost anywhere), the conclusion was jumped to that they were the authors of the mischief. I am inclined to believe that much of the blighting was due to an insufficient supply of pollen quite as much as to the midget, and that had the weather been favorable to a strong, healthy development of the blossoms the injury would not have been so great as it was.

The present seasonal superabundance of this insect is probably due to the extraordinary dry weather of this and preceding years. It is well known that dry weather is favorable to the multiplication of most terrestrial insects; and that many diseases and other agencies destructive to insect life do not take significant effect except when the weather is more or less moist. Inasmuch as these insects have doubtless been present in the strawberry fields of Illinois for many years, but have never before been known to do such serious damage, and as this increase in numbers was concomitant with the extreme dry weather, it does not seem probable that there will be a regular repetition of the damage in the future. Hence this insect may possibly do to the strawberry-grower what (according to a recent remark of Prof. Forbes) the chinch-bug may be said to do to the wheat-grower — serve to emphasize seasonal extremes of weather.

### REMEDIES.

With our present knowledge of the economy of the strawberry midget, little can be said upon this part of our subject. It is not probable that the burning of plantations after the fruit is gathered will produce any appreciable effect upon their numbers, as they largely leave the vines when the blossoming season is over. Nor

does it seem probable that topical applications will prove of practical value. It does seem desirable, however, that the supply of pollen should be as large as possible; and I believe that many of our growers would be benefited by planting a larger proportion of staminate varieties.

## CATCHING AT STRAWS.

BY A. L. HAY, JACKSONVILLE.

This is a strange and peculiar subject upon which to build an address to be read before a people whose lives have been devoted to such a pleasant and uniformly profitable pursuit as that of horticulture.

Were this a convention of drowning men, or an assembly of "boodle" Aldermen about to be sentenced for their crimes, the topic would seem much more appropriate.

But we are a peculiar people; we have assembled for a peculiar purpose. Our deliberations have so far been, and will hereafter be, of a peculiar nature. The influence going out from this meeting will be such as to give men and women peculiar ideas in regard to strange and peculiar things, and will lead to peculiar investigations which will develop peculiar facts, which will lead to a peculiar prosperity of not only our own nation, but of every nation on the face of the earth.

We are not here for the purpose of tearing down the works of others that we may build upon their foundations.

We are not here to advise the destruction of any interest, that we may profit thereby, but we are here for the purpose of advising with one another, that we may, if possible, develop some honest and legitimate plan whereby we may accumulate fortunes which cast a shadow over even that of Vanderbilt or J. Gould, and at the same time bring increased pleasure, prosperity and happiness to every honest creature on the globe.

By reference to the programme you will see that the selection of a subject for this occasion was left wholly to myself, and while such would appear to be a desirable position to occupy, I immediately found myself as badly at sea in regard to what to write about as the lady with an unlimited wardrobe and an unbounded credit in regard to what she would wear at the coming social gathering, and after a week or more of solid thought, I decided upon the above as giving a wider range for gathering material than any other topic which presented itself to me.

Legitimately considered, the "catching of straws" is supposed to be the last resort of any one for the betterment of their own condition, and while these last and desperate efforts sometimes result beneficially, they usually terminate in blasted hopes. The drowning man grasps a handful of straws only to sink with them in death's embrace.

The condemned murderer watches the petition for his reprieve, or the motion for a new trial, with the deepest anxiety only to learn that a just and honest judge has decided that he must abide by the decision of the lower court and swing into eternity. The boodle alderman trusts confidently in a hung jury or a prospective trip to Canada, and while they may meet with a sort of a half-way freedom in their minds they ever fear the well-merited punishment they so richly deserve. And may we not, if we look carefully about us, see something of a determination among those of our profession to practice in some degree this last hope of a drowning man, or "catching at straws." For instance, Mr. so and so has for years been quietly and steadily pursuing the cultivation of certain horticultural products with perhaps but moderate financial success, when a long-winded agent for some new fangled foreign berry, plant, or flowers, induces him to purchase largely of his new and untried product at a fabulous price. Is not the purchaser "catching straws" just as much as the drowning man? When a hard-working horiculturist, who has made a reputation for fair dealing, resorts to shallow boxes or putting all the best fruit at the top of his packages, is he not "catching at straws," for may not his new method of doing business drive his customers from him and spoil his reputation for honesty, and thereby ruin his business.

When the strawberry fields are white with blossoms, and the wife of the horticulturist sees visions of silk dresses and new bonnets floating before her eyes, is she not catching at straws? For may not the midget have said in his heart, "The strawberry crop is mine, tra la! and I will do unto it even as the horticulturist would do unto me, if he knew how and had the power, tra la!"

And when the orchards are redolent with sweet perfume, and each tree resembles a huge bouquet, and the son of the orchardist thinketh that from the proceeds thereof he will enjoy many a moonlight buggy ride, and many a dish of cream with his fair one, is he not catching at straws? For, mayhap, the canker-worm cometh, and humpeth himself, and devoureth every leaf and blossom, and leaveth the orchard as bare and black as in mid-winter. As least such has been my experience, and I am now feeling in my pockets for the shekels that ought to be there and are not.

When the blackberry patch covereth itself with bloom like a blanket of snow, and the lord of creation (or man of the house) saith to his offspring: "Behold ye the immensity of the harvest! Prepare ye boxes by the million, and crates by the thousand, that we may scoop in the coin by the bushel, and make merry with our friends exceedingly!" Is he not "catching at straws?" For may not the burning, blistering, blighting drought play sad havoc with his expectations, and may he not find himself sneaking through his berry patch with an awning over his head and a magnifying glass in his hand, trying to discover the whereabouts of the poor, miserable,

shrunken specimens of berries, a million of which would not make a quart; and may he not be sending to some more favorable locality for a few boxes of the natural-sized fruit, that he may not forget the character of the genuine and valuable berry when it does appear upon his own grounds, or for the making of a little cordial for use during the childrens' teething!

When the grapevine flourishes like the Green Bay tree, and covers itself with bunches of fruit, of enormous proportions, let not the daughter of the horticulturist become proud and haughty of spirit, and throw aside her everyday beaux for something more aristocratic, but let her remember that "pride goeth before destruction, and an haughty spirit before a fall," and before the grape harvest cometh the bluejay and the cat bird, the robin and the thrush, and instead of the rich and purple harvest cometh a mass of dried and wrinkled skins, wherein delighteth the honey bee and the ant, and wherein reigneth contention and strife.

And when the potato crop moveth itself aright, in the early springtime, and the planter prophesieth that the surface of his land will be raised a foot or two by the enormous crop of tubers below, is he not "grasping at straws?" For, behold! the potato beetle cometh early in the morning and tarrieth until the dewy eve, and devoureth that which is wholly above ground, and rejoiceth as the speckled hen which has already laid the rosy-tinted egg; and then cometh the long-geared *Carithardes Vituperations* — or whatever you may call it, and voweth to make inquiry concerning the matter, and paweth up the earth in disgust, and eateth the beets, and the cucumbers, and the tomato vines, and with its paws upon its empty stomach, it devoureth a few leaves from the pigweed, and drags its mortal remains into a neglected fence-corner and passeth away in the agony of despair.

N. B.— In this paper, prepared with so much care and forethought, I have tried to give you a partial description of the success (or rather, unsuccess) of the fruit-growers of Morgan County, during the present season, and if I have succeeded in making you understand their condition, I have accomplished my purpose. I know of no better way in which to close this historical paper than with a touching poetical appeal to your refined and poetical natures.

You will notice that the first stanza makes a stagger at the silvery moon, and in order that you may the better understand exactly what I mean, I will describe to you the kind of a moon it is staggering with. It is not the brand splinter new moon, which chases the setting sun to rest as closely as a yaller dog pursues a retiring rabbit over yonder hill. Neither is it the big, round moon, which looks as full as a goose, and which wanders around all night, not seeming to know when to retire. But it is the last few days or or nights of the first quarter of the new moon, which sets about eleven or twelve o'clock P. M.

The moon was setting in the West,
The sky was clear and blue,
When a fruit-grower sought his needed rest,
But dreamed the whole night through.

His mind was like the glass that hung
Upon his parlor wall,
Past which his checkered life was swung—
His ups and downs and all.

His boyhood days passed quickly by;
Then came his riper years,
When he looked a maiden in the eye
And whispered in her ears.

A tale of love did he unfold,
To break her tender heart,
And they were joined as in days of old,
Until death should them part.

Then passed his later years of life—
He saw them one by one—
As he plowed and hoed the fertile soil,
Till life was nearly done.

He saw the insect tribes go by
In rich and gorgeous train,
And smote them on the hip and thigh,
With all his might and main.

The cabbage-worm passed slowly by,
And moths were there so thick,
He thought, and hove a painful sigh,
Could stir them with a stick.

His thoughts of kraut had passed away,
As he lay there on his bed,
His wakeful wife then heard him say,
"I wish that I were dead."

He heard the blue-jay loudly call
Unto the feathered host,
And thought he said unto them all,
"Of fruit I 'll eat the most."

Then in his mind he packed his grip,
And sought the distant West,
But after all he hung his lip,
And cried, "The Sucker State is best."

Now honest friends, this much is true,
I care not where you are,
You cannot raise good crops of fruit
Without a world of care.

## HEALTH AND DISEASE OF PLANTS.

BY DR. A. G. HUMPHREY, GALESBURG.

The universe is governed by law.—Humboldt.

All living forms, whether of plants or animals, have their periods of growth, maturity, decay and death. In studying the various formations of our earth, science divides the time of their appearance into epochs. During the Primordial epoch the Algæ or Tangle forest and Polypi or Ascidia filled the primeval sea with the simplest forms of vegetable and animal life. The Primary epoch clothed the earth with fern forests and filled the sea with fishes. During the Secondary epoch pine forests and reptiles appear. The Tertiary epoch develops the leaf forests and mammals, and finally in the Quaternary epoch we reach the era of man and cultivated forests. Each of these periods of the development of living forms was governed by the laws and forces peculiar to each of the geological epochs of the world's organic history. The earth, with all its teeming life of vegetable and animal forms, originated and is now perpetuated under undeviating inorganic and organic laws. All observable phenomena are alike subject to law. The terrible and devastating tornado, the gentle shower, the thundering cataract, the placid cascade, the cold blasts of winter and the balmy days of summer, all exist and occur in obedience to gravitation and electrical and climatic changes. The science of chemistry in connection with geological research unfolds the vast field of phenomena connected with the inorganic world. Botany investigates those laws by which the vegetable life-principle breaks up inorganic compounds and elaborates from inorganic materials the varied vegetable organisms that beautify and adorn the surface of the earth. Physiology investigates all the phenomena connected with animal life. Its province is to explain the wonderful process of the vital force in elaborating out of vegetable bodies the distinct parts of all animal organisms.

Plants, like animals, are subject to the condition of health and disease. Germination of seeds takes place in the dark, but the essential condition for the life and health of plants is sunlight. Without the wonderful organizing power of the great luminary of day the vegetable kingdom could not exist. It may be asserted in general that there are three essential conditions for the health and growth of plants, viz: light, heat and moisture. These conditions supplied in certain and regular quantities, the life, health, growth and longevity of that plant is assured. If they are deficient, or are supplied in superabundance, disease, dwarfing and premature decay is the sure result. All plants depend directly on the inorganic elements for their nourishment. The vital laboratory of the plant reduces inorganic compounds and arranges their elements into or-

ganic bodies. These vegetable organisms are consumed by animals and elaborated into animal structure.

In a primary sense, plants subsist upon the atmosphere and what it contains; but they immediately derive much of their nourishment from decaying organic substances that are incorporated with the soil. But before such compounds can be appropriated by plants, they must be resolved into their elementary state. They can be taken into the organization of plants only in the condition of mineral substances, and, even then, the most simple binary compound must be decompounded before organization can begin. The processes of plant organization, and hence the health and longevity of the plants, depend on a sufficient supply of sap, and its proper circulation through the vital organism. Sap is essentially a watery fluid which the roots absorb from the earth, and holds in solution a small quantity of carbonic acid and ammonia, with other mineral constituents. In its ascending course through the cells of the sap-wood, it meets with and dissolves a portion of soluble cell-contents, and thus becomes more and more dense as it approaches the buds, where it is appropriated to the development of the leaf, in which it undergoes a further elaboration, and returns upon the outside of the sap-wood to form a new growth, and in this condition is called alburnum.

The sap-wood is made up of elongated cells joined end to end, or overlapping each other. At the growing season these cells are filled with crude sap, the density of which increases from the spongioles of the roots to the leaves. When first formed the cells are extremely delicate and tender, and may continue their activity for a number of years; but ultimately they become hardened by mineral deposits, and become the hardwood of the tree, and completely lose their vital activity. In a paper written for the Northern Society and published in Transactions of 1884, I maintained that the cells of the plant or tree constituted capillary tubes, and that the sap rose in the tree on the principle of capillary attraction. A more thorough study of this subject convinces me that the conclusions of that paper are incorrect. It has been ascertained that the sap circulates through the vessels of the plant by means of a power equal to, or even greater than that which drives the blood through the arteries of an elephant. The celebrated Hales made a curious experiment, which proves that there are forces other than mere capillary attraction that lift or force the sap upward. Having fitted a long tube to the stem of a young vine which he had severed, he saw the sap rise forty feet high. The conclusion has been reached that the force with which the sap rises in the vessels of the plant is nearly or quite equal to the pressure of two atmospheres. Several eminent scientists, and among them Shultz, of Berlin, believe that there are vital contractions of the tissues of the plant, by which the sap is lifted with great power.

Now, if there is a proper amount of moisture applied to the roots to fill the vessels, holding in solution the inorganic elements neces-

sary for plant structure, with proper thermal conditions and a sufficiency of sunlight, the circulation being free and unobstructed, we have for the plant a state of health. If, however, there is a deficiency of moisture, absence of the necessary heat and light, and the inorganic elements wanting, the plant is in a weakened or enemic condition, which is a form of disease. Or if the fluids are in superabundance so as to greatly engorge the vessels, then under great heat, the delicate walls of the vessels burst asunder, the sap disorganizes, sours, and we have the dread disease, blight. Or again, if under similar conditions the circulation of the sap becomes morbid, natural growth arrested, then we have various forms of morbid growth or fungi.

The germ theory, or bacterian theory, as the cause of disease both in animals and plants, has receive large attention from many eminent scientific men for a decade or more. The results of careful microscopic examinations made by matter-of-fact men, have given the theory many strong adherents. And I think it is generally conceded that the millions of minute organisms that inhabit our atmosphere, have something to do in causing, and very much aggravating, many forms of disease. But with all the evidences revealed by microscopic observations, the theory is not a fully-established hypothesis as the cause of disease. My studies on this subject have forced me to the conclusion that fungus, wherever it appears, and bacteria, wherever they are found, are nearly always the consequence of and not the cause of disease.

Some years ago a paper was read before the Potomac Fruit Frowers' Association, by John Brainerd, on "Pear Blight," in which he gives some careful microscopic examinations of healthy and blighted branches. He says the entire growth, near the blighted portion, was green and vigorous, showing a continuous supply of ascending sap, while the bark and alburnum in the blighted portion, were dark and withered. From his examinations he concludes that the newly-formed cells in the alburnum have, from some cause, been ruptured, and the elaborated sap, destined for the support of the plant, poured out into the interspaces of the cells, coagulated and disorganized, producing, in the vegetable tissue, a condition analagous to what is termed extravasation of blood in the animal tissue. The microscopic appearance of the coagulated sap in the blighted portion was most remarkable. Every vestige of cell formation was destroyed, and nothing could be seen but a dark, coagulated mass, pushed out through fissures in the bark, and this appearance extended through the whole thickness of the alburnum, while the sap-wood remained in a perfectly healthy state, conveying sap to the unblighted portions above. This author, speaking of the causes of cell-rupture, says that when the sap with which these cells are always filled, is subjected to sudden expansion, from either high or low temperature, the cell-walls become ruptured, and the sap, of

course, runs out and is diffused among the tissues, and its nutritive condition lost. The putrefactive condition, which soon follows, gives rise to fungoid growth, or forms a pabulum for bacteria. If the theory that certain organisms in the atmosphere are the cause of many of the forms of disease with which plants are afflicted, then we have but little hope of ever learning how to avoid their depredations. While if the causes are physical conditions, as I have indicated, then it is quite within the province of man to supply proper conditions to maintain the health and usefulness of his plants. For our orchards, the most important of these is situation. A northern or northeastern slope of land is the most favorable, as such a situation will not be subject to the solar heat that would pour upon a southern or southwestern slope. Proper cultivation, and drainage to prevent a superabundance of moisture is also important. Many of our useful plants thrive in shady localities, and so, by planting timber belts around, or planting trees among fruit-bearing trees, good results may be obtained. With a congenial location, good cultivation, careful drainage, and a constant supply of plant food, the horticulturist can plant with reasonable assurance of securing health, vigor, and an abundant fruitage from his plants and trees.

Prof. Burrill — This is not the time to discuss these questions, but the idea advanced by Dr. Humphrey, that bacteria are the result, rather than the cause of disease, I think incorrect. Opinions may not be, and often are not worth much, but when sustained by facts, they become valuable. I will give the result of an experiment that I conducted, that to my mind, is conclusive:

The broom-corn growers of Champaign County have been troubled with a disease of the stalk caused, as I supposed, by bacteria. To test the correctness of my conclusions, I took a stalk and marked it off into checks, and with a camel's-hair brush, painted every other check with pure beef broth, in which these organisms had been grown. The result, in nearly every case was, that on the checks on which the fluid was placed, the disease developed, while the others were exempt. The microscope shows that the red appearance of the diseased stalk is caused by myriads of these organisms which under the glass have the appearance of minute red points. I have tried this experiment over and over again, and always with the same result. It is one of the most direct and conclusive experiments I have ever made.

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## THURSDAY AFTERNOON.

### HORTICULTURE *vs.* BARBARISM.

BY J. J. LOBAUGH, ELMWOOD.

Horticulture is from *hortus*, a garden, and means garden culture. A garden is defined as a place set apart in which to cultivate plants, fruits, flowers, etc. The terms horticultural and pomological are not exactly synonymous, and my subject to-day covers a wider field than simply fruit culture, and in what I may say you will bear in mind I am referring to plants and flowers as well as to fruit.

Agriculture is from *ager*, a field, and means field culture, the production of the plainer and more substantial things of this life, while horticulture may be termed the finer or more artistic part of husbandry—the cultivation of things not only very useful, but with special qualities to attract the eye or tempt the appetite, things that not only nourish the body but that charm the senses, that embellish life and blend the ornamental with the useful, and thus, by developing in man higher sensibilities and finer discriminations, appeal to his æsthetic nature and raise him to a higher plane, thereby removing him to that extent from his primitive condition of barbarism.

Plants, fruits and flowers—there we have utility of the most practical kind joined with ornamentation of the most pleasing kind.

He who can successfully work out to a definite conclusion this combination from its elementary principles, air, earth, water and plant life, may be as much of an artist as he who elaborates his conceptions in the beautiful painting, as he who originates in his mind the graceful temple, the ornament of a city, as he who chisels from the rugged marble the finely proportioned statue. And why not? "By their fruits ye shall know them" has a logical application in this connection, and the products of the science and skill of the horticulturist may well challenge comparison with the productions of any other line of cultivated thought, for they are often highly ornamental as well as practically useful.

Were we satisfied to have only the necessary in its plainest form, we might live as do the uncivilized, in whom are developed none of the finer possibities of their nature.

The inhabitants of the extreme north have scarcely any of the comforts we possess. They have no agriculture nor pasturage, few wild animals and no forests where the hunter may range in search of game. No beef, mutton nor pork. No fruit, bread nor vegetables. No sugar nor salt, no tea nor coffee, and (most fortunately) no spirituous liquors of any kind. No silk, cotton, flax or woolen fabrics. No iron, steel, copper, lead nor gold. No pottery. No

soap. No wood, coal or peat for fuel, and I need scarcely say they have no horticulture. They simply exist and are in a way happy and contented just as an animal might be satisfied in a burrow. Their wants are limited and their supplies are likewise limited.

The Arab dwells on the hot sands of the Sahara. To-day he reposes under a date palm by the Nile, and to-morrow he pauses in his wanderings to rest himself in the shadow of a great rock in the desert. All the land is his, but never a home has he. He lives on his dates and the milk of his camels, as Abraham may have done thousands of years ago, and as the descendants of this man may live in the centuries to come. No agriculture, no mental, moral or spiritual culture, and need I add, he has no horticulture. By the brackish fountain the plants, the fruits and, the flowers may spring up spontaneously to charm his eye and please his palate. He may pluck and enjoy, but he never cultivates nor improves on what nature has given him. He may be to some extent a fruit-eater, but he is never a horticulturist. We have more numerous wants than either of the classes I have referred to, and fortunately for us our supplies are more numerous also.

It may be said that many of our wants are artificial, and their gratification not a necessity. From the standpoint of the untutored savage, this may seem true. For what are books, pictures, poetry, music, fair flowers or fine fruits to him? Perhaps meaningless terms. But with us it is not so. We have learned to take our pills with a coating of sugar. We eat from gaily-painted dishes with spoons and forks, plated with nickel or silver; we have bouquets on the table and bloom-plants in the windows — in short, we combine the agreeable with the useful, and therefore we have, as a natural result, diversities of taste, diversities of enjoyment, and diversities of employment. Among the many industries that have sprung up, in answer to the demands of our diversified wants, no one is more useful or more agreeable than the cultivation of plants, fruits and flowers, which we call horticulture.

If the wild man is a crude and undeveloped being, inferior in all the qualities which make the civilized man attractive or useful, so is the wild flower a very inferior production when compared with the cultivated varieties.

It is true that wild flowers are not devoid of beauty, especially when growing in clusters in shady nooks or on sunny slopes we individualize one, and scan it closely, we will be surprised to see how little there is in it; how few the parts in the blossom; how comparatively faint and transient the hues, and how meagre the aspect.

Take the wild rose as an example. The name sounds poetic, and there seems a halo of romance about it; but the flower is really a very insignificant thing. Pluck it, and how soon it falls away, leavin your hand only the stem and the seed-pod. The golden rod and the silphium have little individual beauty, but their clusters of yellow

flowers add brightness to the autumnal landscape, and contrast finely with the purple asters by the hedgeside. But when the human heart yearns for flowers to aid in expressing its emotions, whether of joy or grief; whether it be to reward the student, to adorn the bride, or to express sorrow for the dead, we seek not the poor, expressionless things by the wayside, but we select those of fairer bloom, of richer hues, of more enduring form, developed by the care, the culture and the skill of the modern horticulturist.

We speak of wild fruits, and the old man's eyes brighten, till he seems almost to fancy he is a boy again "upon his native heath." He forgets that "distance lends enchantment to the view." The strawberries in the old pasture were not half so sweet as they seem to him now; really they were poor sour things he would scarcely tolerate now. The huckleberries on the hillside were pretty, but insipid, and he forgets there were rattlesnakes there too. The wild plums were red, but hard and bitter, and certainly not at all good, nor to be compared with the cultivated fruit.

Take the apple, which may be almost styled the king of fruits. The wild crab has a beautiful blossom, one of the fairest of all the springtime, but that is the best part of it, for the fruit is hard and utterly unpalatable. Even the traditional small boy, with his omniverous appetite, would scarcely hunger a second time for a bite of wild crab-apple, for it is in its way an unmitigated and uncultivated barbarian, while the Bellflower shows the effect of the scientific culture of the modern horticulturist.

But not only has the horticulturist made a great improvement on the imperfect models nature has given him, he has also utilized some things that were not apparently designed for any particular use. The Osage Orange, in its native home, is a tree in the forest, but the man of science has transplanted it to our colder clime. He has said to it, "Thus far shalt thou grow, and no farther," and in its diminutive state he has compelled it to stand an armed sentinel, ever on the alert to guard his enclosures from unwelcome intruders. You have only to look about you in this prairie country to see how beauty may be combined with utility even in the hedge-row, which is a much more agreeable feature in the landscape than the unsightly old-fashioned rail fence.

Horticulture is also a great pecuniary advantage to the dependent classes by furnishing them a reasonably remunerative employment adapted to their ability. Whatever tends to make these classes in any degree independent and self-supporting, exerts a civilizing influence of no mean order. In a strictly agricultural district there is little the women and children of the villages can do to contribute to their own support outside of their own families. Farm-work is too heavy and laborious for their strength, and even the men are now throwing the burden of it on machinery of various kinds. But in horticulture it is not so. Much of the labor is light and not dis-

agreeable. Transplanting, cultivating, gathering and preparing for market are not above the physical capacity of the women and children, and the remuneration they receive is no inconsiderable item in every community where horticulture is carried on. The fruit business in this village is only in its infancy, but in the few years in which it has been in existence a comparatively large amount of money has passed into the hands of the nearly helpless classes for their labor in the fruit-gardens; and who can estimate how much of comfort and civilization has gone into many humble homes through this one unpretending instrumentality.

What will the future bring forth? If we may judge by the past, we may reasonably expect much. The fourth century has not expired since the few people who then occupied this land lived by the chase, and such rude agriculture as the women could conduct by hand labor. Many acres were thus required for the support of one individual. The population is now numbered by millions, and is rapidly increasing. Thus far, the capacity of the soil to furnish sustenance has become developed in an equal ratio. But how may it be one thousand or two thousand years hence? Wars will probably be fewer; pestilence, perhaps, conquered by science, and the average of life lengthened. How many inhabitants will there be, and how will they live? One acre may be required to contribute a support to many persons. How can it be done? Not by the hunter, for his avocation is nearly gone now. A boy cannot hunt a rabbit on most of the lands in this vicinity, without incurring the penalty of the law, just as would be the case on the estate of an English nobleman. No Nimrod supplies our tables from the forest, but our purveyor of mutton-chop and porter-house steak is strictly a man of business, and fast becoming a man of science.

Our baker and miller are no longer found combined in the person of a half-clad woman pounding her own corn in a mortar, but our bakers are almost artists in their line, and our millers are becoming like princes.

Agriculture has magnified itself through improvement in varieties of seed, improvement in manner of cultivation, improvement in knowledge of the soil, its requirements and capabilities, improvement in methods of securing the products, and vast improvement in the manner of distributing them, till now it would seem to have nearly reached the limit of progress. Can it promise to feed and clothe the coming multitude, whose eager footsteps even now almost seem to fall upon our ears? I fear it cannot hopefully do so. Where, then, is the hope of the future? What is to prevent our descendants from starving like over-crowded animals in a pen? In my humble opinion it lies in that one word, horticulture.

This prairie country, with its wonderful wealth of soil, its unparalleled power to resist the effect of extremes of heat, of rain or drouth, is all to be utilized to an extent not now dreamed of.

There will be no room for weeds, there will be no waste places, and the man who can do most to hasten this condition of things, who can make many plants grow where only one grows now, who can make the desolate places glad and the wilderness to blossom as the rose, he is the coming man. At his magic touch this bountiful land will in time become one vast, luxuriant garden, filled not only with the plants and fruits now familiar to us, but possibly with others that may yet be discovered, developed and utilized by the cunning hand of the future horticulturist.

May we not reasonably anticipate that with this wonderful development, and the æsthetic culture that will doubtless accompany it, there may be a corresponding moral and spiritual growth, that our civilization may be of a more enduring character than that of the nations of antiquity? Greece and Rome were not without culture. In some lines they remarkably excelled their predecessors, and their successors thus far. The Grecian may have known more of the philosophy of taste, and science of the beautiful than the most enlightened man of the present day, but Grecian culture was only a heathenish thing after all, and entirely lacking in the elements that could have given it perpetuity. It was æsthetic, but it was not symmetrical. It was as if the horticulturist should endeavor to develop a more beautiful flower while neglecting the stalk and the foliage. It could only be a failure, for in order to improve the bloom, the stalk and the foliage must also be improved. There must be a development in all the parts of the plant, and as a natural result the flower will exhibit new beauties and attractions. Fine art and polite culture, growing on the feeble stalk of heathen mythology, and garnished by the foliage of heathen philosophy, could only wither and die. A genuine culture must grow on the strong and vigorous stalk of Christian rectitude, and be embellished by the foliage of the Christian graces, thereby producing a harmonious development of the whole man. He who loses sight of this great truth, what is he more than a Greek? He who entirely ignores it, what is he more than a Roman? He who lacks the capacity to perceive it, what is he more than a barbarian? He who discerns it, comprehends it, and endeavors to profit by it, will, in the coming years, be called the Wise Philosopher.

## A POEM—THE APPLE.

SERVED IN DUMPLINGS.

BY E. R. BROWN, ELMWOOD.

"Comfort me with apples."—Song of Solomon. 2-5.

The Poet spreadeth himself and extolleth the Apple—His mouth greatly watereth over the rehearsal of the varieties and the *appela*tions thereof—He seeketh the old orchard with the oriole and the yellowhammer, and interviewetb the caterpillar in the door of her tent—The Poet also hath a vision, after the manner of Saint Peter—He reveleth in Apple Paring Parties, and recalleth the outside and inside, and the cider of those occasions—He giveth a recipe for hot apple pie, and then, like the fragrant steam thereof, quickly subsideth.

### DUMPLING NO. 1.

THE APPLE IS KING.

I sing not the fruitage of old Yucatan,
The citrus of Spain, or the plums of Japan;
The Florida orange may glow in the south,
The peach of New Jersey may melt in your mouth;
The broad-breasted quince has a heavenly smell,
And I love California's apricots well;
Bananas of Nassau and Malaga grapes,
In clustering richness and ravishing shapes,—
They're beautiful, all, but bepraise them who will,
A ruddy old monarch out-ranks them all still:
A fruit universal, coeval with man:
'Tis the blessed old APPLE; gainsay it who can.

### DUMPLING NO. II.

SOME NAMED VARIETIES.

Of the spherical beauties inspiring my verse,
It makes my mouth water the names to rehearse;
It call up the flavors, the scents and the joys
Of seedlings, beloved by the bare-footed boys:
The tree by the roadside, the scrub by the stream,
With fruit at whose sourness a bluejay would scream,
The "Dub Stem," the "Long Stem," and "Water-core Sweet,"
"Spice Apple," and "Pig Nose,"—O, what a rich treat
To the hungry boy's teeth, in the brave long ago.
A relish no wealth-pampered palate can know.
Boys claimed them and named them, and boys, with the worm
And the squirrel were joined in an apple-grab firm;

And the names of the ruby-cheeked seedlings we knew
To shape and to flavor were fitting and true.
E'en the catalogue names it is pleasant to hear
Which glibly the peddler pours into your ear.
There 's the famous "*Fameuse*,"—she 's Canadian, you know,—
In a bright crimson vest wraps her bosom of snow;
The "*Roman Stem*," every-day, plain and humdrum,
And the "*Maiden's Blush*," tender and juicy (yum, yum!)
The acid old spinster, the "*Belleflower Yellow*,"
Looks down with contempt on that kindly old fellow,
The "*Rambo*," and warns him to keep proper distance,
While "*Jonathan*" laughs at her threats of resistance.
Respectable "*Baldwin*" gets red in the face,
But swears by Pomona's whole catalogued race
That naught but sweet cider he smells of or touches,
But leaves "*Sops of Wine*" to the "*Oldenberg Duchess*."

## DUMPLING NO. III.

### THE TREE AGENT.

Yes, 'tis music to list to the tree-peddler's lingo,
And yet, if Beelzebub needs him, by jingo,
I'll warrant his cheek, and so every man will,
To make old Be—elzy a capital anvil.
That tree-agent cheeky, with samples entrancing,
I dreamt that I saw him on nothing a' dancing;
His dear little order-book, nailed to his breast,
This legend bore: "Peddlers must give us a rest."
In Peter's strange vision there came down a sheetful
Of queer-looking creatures, a nondescript street-full;
But in mine there was only a peddling defaulter
Let down from a tree by a retributive halter.

## DUMPLING NO. IV.

### THE ORCHARD.

The old-fashioned orchard in memory dear,
Its bloom is the glory of all the round year;
There lover may loiter with innocent lass,
And no one shall startle with, "Keep off the Grass!"
There the oriole flashes in black and bright gold,
While cat-bird and blue-jay with jealousy scold,
And well you may know, by the clubs in its top,
What tree bears the earliest, toothsomest crop.
Her tent in the branches the canker-worm pitches,—
A tent-maker skillful who never drops stitches,—
Her children uncounted squirm forth from the nest
To gorge on green leafage and never to rest
Till the farmer's old musket invites them to stop,
Or the woodpecker gobbles them into his crop.
When the sun of October paints leafage and apple
With russet and crimson and brindle and dapple,
And, mixing fresh tints on a calm evening sky,
Puts a flush on the "Fulton" and stripes on the "Spy,"

How fragrant the heaps that for cellar or mill
Lie under the trees, and the wonder grows still
That families small many barrels must store
Of cider, — for vinegar, — same as of yore!
E'en the cider-mill teaches of nature the law,
Some blessings are sweetest when drawn through a straw;
The smaller the apple and redder the skin
The better the cider that's hidden within.

## DUMPLING NO. V.

### THE APPLE PARING BEE.

I recall now the days when 'twas Puritan creed
In garret and cellar to store against need
Dried boneset for sickness, and pork for the spider,
Blue yarn for mittens, and jars of boiled cider;
But chief in the list was the rich "apple-sass,"
Well flavored with quinces or wild sassafras,
Not less than a barrel to last all the year,—
On company days 'twas the pride of our cheer.
To its making the matron invited a legion,
The rustics and maidens of all the wide region,
Like "quiltings," or "raisings," and "huskings" so free;
But best of them all was the famed "Apple Bee,"
There swift fly the hours, full of innocent mirth;
There pedigree plays second fiddle to worth;
There Jane with pink fingers sweet apples is paring,
While Jonathan quarters and cores, often daring
A long coil of peeling to toss o'er his head,
To fall in initials as fateful when read
As the Delphian Oracle's awe-striking token,—
Two J's in a looping that cannot be broken.
When work is all done, quick they sweep every scrap up,
And round the big chimney the old game of "snap-up"
Rolls on through the best room, hall, spare room and kitchen,
Till grand'ther's cracked voice cries, "Look out for the britchin'!"
Then the jolly old fiddle, oft counted profane,
Shrieks out, with a lively old "shave-her-down" strain,
"Zip Coon," "Soldier's Joy," or "Virginia Reel,"
With a shuffle of pumps and a clatter of heel,
Till the welcome announcement, "Refreshment is nigh!"
Great pitchers of cider and acres of pie!

## DUMPLING NO. VI.

### APPLE PIE.

O, the hot apple pie! 'tis a work of high art,
Regaling the senses and warming the heart.
Now list, while I give you a precious prescription
For building a pie worth a poet's description:—
Right deftly the fruit, tart and tender, bestow
On a wide snowy sheet of the liveliest dough,
White sugar and nutmeg sift on with neat fingers:
Touch lightly, work quickly,— no true artist lingers:—
Next a slice of sweet butter, some cinnamon dust,

And now with dexterity lay the top crust
And away to the oven, thence soon to appear
In a cloud of rich fragrance the table to cheer.
'Tis the Yankee's delight; but to make it complete
There's an old and wise adage I beg to repeat,
That the best apple pie, if it's served without cheese,
Is like giving a kiss and—omitting the squeeze!

### DUMPLING NO. VII, AND LAST.

When Jupiter had his "swell wedding," we're told,
Hesperian maidens brought apples of gold
By the apronful, love for the gay bride to prove,
And a smile of approval to win from old Jove.
But what, pray, are apples of gold to compare
With the "Astrachan" juicy, or "McIntosh" rare?
Three cheers for King Apple, red, golden and streaked,
Elliptical, spherical, spheroid or peaked,
Sub-acid, mild, bitter, or spiced like sweet pickle,
Or sours that would sharpen the teeth of a sickle,—
Hurrah for King Apple! for pleasure or gain,
For health and for beauty—O, long may he reign!

## NATURE AS A MECHANIC.

BY DR. LYMAN HALL, CHAMPAIGN.

If asked what nature is, I would say it is art by a master mechanic not well understood; but many structures can be comprehended. Mechanic I would define as the art to build by exact rules; none of its rules are defective; when a mechanic builds a form it is perfect in all its parts.

Art, in order to build, must have a design or form to construct, and then of absolute necessity must have material with which to build. It is in the material universe I will search for a something to work with.

Thales, and his contemporaries believed fire, air, water and earth were the premordial elements capable of mutual transmutation into each other, and so combining as to construct all nature, hence they believed and proclaimed this axiom, "That all things are convertible into all things."

The Stoics maintained that there are two first principles, God and matter; not that they regarded God as an element, but rather as the active principle, while matter was a passive state. In all their teaching they had many great truths that have stood the scientific tests that has been applied to their teachings.

At the present time there is known to science, in round numbers, about sixty elements known as molecules; and they, in their mechanical combination, build all the varied forms which go to make up nature, and however varied the forms of nature are, but very few of the simple elements enter into the mechanism of form. In man,

there are only about seventeen different molecules, and some of them enter his tissues as by accident, not being essential to his well-being or health.

Oxygen, hydrogen, carbon and nitrogen are about all we need to use as correlator as mechanic, the same rules that use these simple elements run through all nature, each member being true to the mandate that bids it enter its form — be it the solid rock, or gems of beauty, or vegetation, whose bloom is full of fragrance, sweetness, and beauty. The luscious fruit to please the eye and gratify the taste, all animated nature by the transmutation of the elements are mechanically made into form.

Here let me remark, lest I be misunderstood, the mechanical forces are but secondary laws; back of them all is the great Master Mechanic, whose volition has constructed the universe out of chaos and who must have made the law that governs the molecules with a mechanical precision — a master mind, a being that defies the perception of every sense, and which at best to the intellect is but a negative object, that can be comprehended only by analogy or abstraction.

Sir Isaac Newton advanced the theory that there was some subtle agent in nature that bound matter together, which, investigated after his day, it would be able to demonstrate. Strabo taught that all things were in motion and undergoing changes, that the earth was augmented and diminished, that there was attraction and repulsion.

Since these savants' days, the magnetic forces have been discovered as the moving, propelling agent that set in motion every atom in nature.

Let us then reason by analogy. We know the earth has form, also motion. We know it has a pole around which it revolves. There is a magnetic current that deflects the needle; there is a perpetual force in this magnetic current. We know there are vast commotions in the sun, and when watched through the telescope, the least perturbation in the sun disturbs the magnetic current of our earth. The telescope reveals a like condition in the entire solar system. The spectroscope reveals that our solar system is constructed with the same molecules, unless it be the sun. The sun has two elements entirely unlike anything on the earth. All the members of our system being under magnetic impulses, every atom that enters into these bodily forms must be magnetized, held in position by a two-fold force, a centripedal energy to draw towards a center, also a centrifugal, to roll away — a law of attraction and repulsion, a positive and negative energy. We may reasonably infer, if this magnetic energy was withdrawn from the molecules of the earth, it would at once be dissolved into cosmic dust, and our beautiful earth would pass away in an instant, as the Apostle Peter has it, "with a great noise."

Magnetism being the agent that makes the atoms or molecules love each other, they unite to form compounds, as in the great problem, water made of oxygen and hydrogen, one acting magnetically as a metal, the other a non-metallic agent. Water, as our earth is built, is the most important material in her wonderful edifice. Without it, nature would be incapable to carry forward her art of construction and creation. Some of the earliest speculators in philosophy maintained that all the material which composed the universe existed at one time in the form of water. The teaching of modern geology has reproduced nearly the same doctrine.

Perhaps the next most important element in nature is carbon. With a few other elements it builds up continents and clothes them with vegetation. I would not forget that the phosphides, potash, chlorine, soda, nitrogen, silicon, iron, etc., are material in Nature to carry on her art.

I will take as a type, to show how Nature builds an apple tree — as this theme is the subject of this august coming together — to see how we can utilize Nature to conserve our purpose.

The seed germ, I can only say, is a fiat order. I know not how to define; and yet cannot do without admitting a Being who has directed the germ to form. And all the primordial forces are, at best, to the intellect, but negative objects, not comprehended only by analogy or abstraction.

We gain a glimpse of it by abstraction, when we say that the first matter is not the lineaments and complexion which makes the beautiful face ; nor yet the flesh and blood which makes the lineaments and that complexion ; nor yet the liquid and solid elements which makes the flesh and blood; nor yet the simple bodies of earth and water which makes these various elements ; but something, which being below all these, and supporting them all, and yet different from them all, is essential to their existence.

We gain a glimpse by analogy, when we create a work of art to imitate a substance of Nature. Ours is a secondary form; so is the first and original matter, to all forms in general. So we infer the molecules are the substratum of all forms known to our senses, and their loving impulses to combine is magnetism to create, a vital force, an energy to build form.

The germ of the tree is quickened into energy by moisture, and heat from the sun. It is by the sun's beams the polarized angles of the molecules are shaped to exactly fit the edifice they are about to rear, with as much precision as the carpenter would a brace or beam to support a building. If we could magnify the molecules so they could be seen with the eye, they could be beheld marching with martial step to take their proper places to create cell and fibre of the tree. Every atom is deposited at the proper place with a view to a perfect end.

Nature appears to have in view variety in her edifice. It is a marvel with what ease she perfected this end, and also placed it under the control of man. The cells, or polarized angles of matter, in the cambium of the tree, have the power to change the fruit; so we can convert a worthless tree to one to please eye and taste.

The combining property, no doubt, is an inherent power existing in each variety of tree, of so arranging the molecules as to form the different flavors, shape and color of fruit; sunlight also entering largely into the mechanical work of perfecting a perfect fruit or order.

It is oxalic acid, when most perfectly combined, that imparts the finest flavor to our apples. Perhaps in those apples that are so intensely sour that we instinctively revolt against them, there is too great an amount of oxalic acid in their make up.

Oxalic acid, as met with in commerce, is a white acid salt, chemically made with sugar acted upon by nitric acid. Its molecules are as follows: H 2, C 2, O 4, H 20. So its monads would be 2 HO, C 4, O 6, 4 HO, with polarized angles of 126 degrees. It is said a drachm will kill an adult in ten minutes, when taken into the stomach; first, by causing an effort to vomit; second, great pain, prostration and death. This potent and deadly poison, when chemically combined with the pulp that goes to make up the solid structure of the apple, can be taken into the stomach with impunity—may be eaten with a keen relish. The peach depends, for its delicious flavor, on prussic acid, or cyanogen, another deadly poison. In the apple, three simple elements, carbon, oxygen and hydrogen, appear to be be the important agents to build and give character to our apples.

What has been said, in this brief manner, will apply to all fruits. It may be asked why we have apples ripening at different seasons. It is because some varieties have their molecules and monads perfected with a less number of sunbeams than others. Thus, while the Red Astrachan may have its monads perfected with a million sunbeams, that give energy to every molecule in nature, it would take a hundred million to bring forward to a static state, the Wine Sap, or Minkler. The mechanical structure of the leaf must also have much to do in giving type to the fruit and bringing it forward to a state of ripeness.

It is the vegetable kingdom alone that groups into form the molecules or the invisible substratum. It seems nature, as a builder, had in view a higher form of art than merely to construct a something that had no volitional powers. Every step in nature's art she seems to foreshadow a more noble edifice, a more complex structure. As if nature was reaching out through her mechanical energy to gain an automatic, instructive, intellectual place to display her skill, and have all nature work harmonious together, and whether vegetable or animal, each has its own apparatus to carry forward its own

plan. As in a dissolving view, new objects emerge from old ones, and new forms spontaneously appear without the exercise of any periodically creative act, there is a transmutation of individual form to form.

As in the tree, having an inherent power to arrange the elements to perfect its fruits, as we said, by energy imparted to its atoms by the sun, so animal life has an instinctive force within her own tissues to carry forward her work to build her fair fabric. But, unlike the vegetable kingdom, does not have to gather her building material from invisible substratum, but finds it already for use in the vegetable world, in countless forms, to enter into new forms.

Perhaps a simple illustration will suffice to elucidate this problem. Take, for instance, wheat flour, as an article of food. The vital powers of the stomach will reduce it to starch, of which it principally consists — first into chyme, then into chile; each mutation it undergoes has an impulse imparted to it by the physical system, converting the wheaten flour into *casin-fibrin* and albumen, substances, until very recent times, thought to be distinct substances, but chemical experiment has found they are but modification of one substance, which is now regarded as the original of all the tissues; and, further, that protein, in every respect identical with that which forms the basis of the three aforesaid animal principles, may be obtained from similar elements in the vegetable kingdom.

To return to the flour, in its onward course, it still undergoes changes in the lumen of the system not fully settled by physiologists. It becomes blood, abounding in globules of marked construction, all fabricated beyond doubt from the flour. By a further correlation, its globules undergo changes that neither the chemist or the observation of the microscope can explain. The blood has become vitalized and becomes a form, and when this transmutation is complete, and converted into animal tissue, not one particle of the original flour can be detected by all the modern tests of a vaunted science.

The scientist can tell the exact number of the molecules that enter the flour's make-up. He can follow it through its mechanical changes until it is converted into muscular plasma, but how it is vitalized and becomes a living force is beyond his ken. Yet we can but marvel at the extraordinary changes which a simple alimentary substance may undergo in the animal frame; and if we admit with the ancient philosophers, that every such substance is resolvable into one or more of the elements, and that all the elements are but a different modification of one common matter, how wonderful a thing must form be, since it imparts such varied appearance and qualities to one common substratum, I cannot but feel this mechanical energy has for its ultematum to build up a *form* that will be eternal, whatever it may be, matter or spirit.

I cannot but love the sports of nature, and admire its energy and conservation, whether it builds vegetable or animal life, and contemplate what marvelous structures can be formed with a few simple molecules, by the forces from the sun raising all forms into position; and then again realize that when the tree dies, or a man is pulled to pieces in his grave, the forces which were expended in building them up, will be given up again in heat or work.

In conclusion, I would remark that the magnetic force is the moving, propelling agent that sets in motion every atom in nature. Without its agency no gem of beauty that decorates the vault of Heaven, or segregates the cosmic dust of earth, would take place. Not a spear of grass could grow, or the beautiful tints of the rose be formed, without this magnetic impulse. And all energy appears to be imparted to it by the solar beam.

At every advance we make in nature as a builder of form, we see the truth established, that all things are convertible into all forms. Then let the poetic strains of music vibrate in our hearts, as when the morning stars sang together in adoration of Him who presides over the universe — one whom we feel the sweetest word in our language, "Love," gives but the faintest conception of his fostering beneficence. At every step in creation, the advance has been tending to greater perfection, to a nobler form, as if nature had in view to build something that would become immortal. Of this we know not — can only hope and fall back on the beautiful picture Pope has drawn in poetic verse, when he wrote:

> "All Nature is but art, unknown to thee;
> All chance, direction, which thou cannot see;
> All discord, harmony, not understood,
> All partial evil, universal good;
> And spite of pride, in erring reason's spite,
> One truth is clear: Whatever is, is right."

## THE MANUFACTURE OF CIDER AND CIDER VINEGAR.

BY H. M. DUNLAP, SAVOY.

A very rapid advance has been made in the method of making cider and in the processes for refining and keeping it sweet, during the past decade.

The old method of fermentation and distillation into the product known as "Jersey Lightning" or "Apple Jack," is no longer in vogue, or its manufacture is confined to a very narrow limit.

The demand now is for a clear, sparkling, sweet beverage retaining the flavor of the fruit; a strictly temperance drink, delightful in taste and beneficial to health. The time has now come that cider-makers must furnish such cider as this, or go out of the business altogether. Nothing has stood so much in the way of a market for cider as the common method of its manufacture. Made as it was, and

commonly is on the old hand-press, the product was part cider and part pumace, a muddy compound flavored with rotten apples from which the average customer turned in disgust, or drank because it was called cider.

Cider-makers have replaced these old mills with the improved machinery of the present, pay greater attention to the quality of the fruit used, and the cleanliness of everything that comes into contact with cider. It is now possible, with improved methods, to make cider that is a pleasure to place upon the market, and the public once having tasted cider of fine quality is beginning to distinguish between a good and a poor article. There yet remain many, however, who assume that cider is of necessity all alike, their impression coming from that which they drank through straws when they were boys on the old New England farms.

When all cider-makers are alive to the necessity of a better article, improved methods of cider-making and refining, then the demand for cider will increase until the temperance drink of the American people will be pure sweet cider.

It is not my purpose to enter upon the discussion of sweet cider as a harmless, health-producing drink, for in a body of intelligent horticulturists this is not necessary. The sentiment of the times demand that cider shall possess no effect calculated to produce intoxication, or lead thereto; and this sentiment is right and just, and if we, as cider makers, fail to meet this demand, we must close up shop.

It becomes necessary, then, to *keep cider sweet.* To this end we must direct our experiments. In the first place, sound, ripe fruit is a primary necessity, for without that, all future treatment is without avail. It is as impossible to make first-class cider out of poor fruit as it would be to convert a scrub into a thoroughbred. The apples must be reduced to a fine pulp, and expressed through cloths which act as a filter, retaining all of the pumace. The cloths, vats and press must be scalded at least once each day, and kept perfectly pure and sweet. The product then, after filtering, is ready to be stored in the cellar in perfectly clean barrels.

Thus far, then, to sum up, we may say that good cider depends upon sound, ripe fruit, clean handling, clean packages, and the best machinery.

Before entering upon the process for the preservation of cider in its sweet state, I must digress for a moment, to discuss the cause of fermentation, that we may better understand the difficulty that the cider-maker meets with in attempting to control fermentation. I take it that all understand the germ theory of fermentation; that certain microscopic spores exist in the air, floating here and there with seemingly no purpose in view any more than the butterfly as it flies from flower to flower. But in the great laboratory of Nature, even those microscopic organisms have a mission to perform. According to this theory, these spores come into contact with the cider

at the very first step of its manufacture; or, in fact, are deposited upon the surface of the apple itself. As soon, then, as these spores come into contact with suitable material for their development, they germinate, develop, and increase with astonishing rapidity.

In the case of the apple, it rots, and cider undergoes fermentation. Now in the case of rotten apples, you will perceive at once that, being filled with these organisms which have already induced decay in the fruit, it is folly for the cider maker to grind them up together with sound fruit and expect the product to remain sweet. As well expect a human being to remain in a state of health and inoculate him with the micro-organisms that induce scarlet fever. Therefore, if you wish to keep cider for any length of time, use sound fruit. This is the first thing to guard against, but not all by any means. These germinating spores are too numerous and insidious to let us rest here. They drop into the pumace as it is transferred to the press, into the cider as it runs from the press, and only awaits the necessary condition of temperature to spring into growth and induce the process we call fermentation. Having, however, excluded these spores that are already in a state of action in the rotten fruit, we find it easier to control the dormant spores that are in the cider. The racks and cloths, if sour, contain these active spores, and hence the necessity of steam or boiling water to destroy them, and thereby keeping the utensils used in the manufacture of cider entirely sweet and pure.

There is also one other point of importance, and that is that these fermenting spores apparently are much more numerous during those days in which the atmosphere is in that condition which may be described as "muggy"—a state of humidity which we commonly speak of as close or sultry. On such days as these cider will be in a state of fermentation almost immediately after and sometimes before it leaves the press, so rapid is the multiplication and growth of these organisms under conditions especially favorable to them.

Clear days, therefore, together with cool temperature, are best for successful cider making. Hence we should plant for cider making later ripening varieties of fruit, that can be made late in autumn or early winter. All cider makers are aware that cider made in winter keeps sweet better than that made in early autumn. This is due to two causes: first, a greater amount of sugar is in the fruit which ripens at that season, which of itself tends to preserve it; and second, the lower temperature which exists at that time prevents the germination of these fermenting spores.

The best and only method of preventing fermentation in early-made cider is by heating to a temperature of about 175 degrees Fahrenheit, and placing same in an air-tight package and sealing up while hot, following exactly the usual method of canning fruit. Cider put up by this process I have kept through the second summer, as sweet as when it ran from the press. The objection to this method

is that it changes to some extent the flavor of the cider, and when opened for use it undergoes the ordinary process of fermentation, precisely as will canned fruit when exposed to the air.

The other methods of preserving cider are to make it as late in the season as possible, and then to destroy these fermenting spores, or hold them in a dormant condition by the addition of some antiseptic, of which there are many advertised in the cider journals. All of them, or nearly so, have as their active ingredient, either sulphur or salicylic acid, the latter being the most used. One ounce of the acid to thirty-two gallons of cider being the rule.

### CIDER VINEGAR.

The business of making vinegar was at one time very profitable to the horticulturist, but the law of Congress enacted in 1879 has completely, or nearly so, rendered the business unprofitable, and all the prominent cider-makers have ceased its manufacture altogether. The law referred to removed the tax from alcohol made for the purpose of vinegar manufacture, and this has so cheapened the price of vinegar that that made from apples — which on account of its nature cannot be made so cheaply — is driven off the market.

However, every farmer, at least, should make his own vinegar, and the cider-maker can, I believe (at least, I have done so), make his early fruit into vinegar at a profit.

I have been through the whole experience of the testing of methods for the making of vinegar, and the mere mention of the processes which have been tried and found wanting, will touch a tender spot in the memory of every vinegar-maker present. I will mention among others the racking-off process, wherein the operator drew off a gallon from each barrel and transferred it to its neighbor as often as once each day; the Beach-shaving process with its mouldy shavings and inoperative supply tub; the groved-shelf process, with its slimy "mother" and numerous gnats; the open generators, where cider fell three feet through a closed, heated-air space, etc., etc.

All have proved a source of vexation and disappointment, and one after another was laid aside as useless or inexpedient. I have gone back to the slow process of barrel manufacture, but have been able to decrease the length of time over the old process in a very simple manner. After the cider that is intended for vinegar is made and barreled, the barrels are elevated into an upper story, and on the approach of winter one-third of the contents of each barrel is removed and placed in other casks, leaving the barrels two-thirds full. Then I leave the barrels and their contents in this upper story and allow the frost to do its work. The barrels will not burst, as they are not full and there is room for expansion. In the spring, when thawed out, the barrels are rolled over in order that the contents may again be intermingled, and then allowed to stand. By May or June, almost every barrel so treated is excellent vinegar, while if they had been

placed in the cellar over winter many barrels would not become vinegar within two years. Do not make the mistake, however, of leaving vinegar already made exposed to the frost. One object in having the vinegar in an upper story is to escape that pest of the vinegar-maker, the barrel-worm. But this essay is already too long, and I will close, thanking you for your kind attention.

Dr. Humphrey — The plan of canning cider, referred to by the essayist, is an excellent one. It is a pleasant and healthful drink. Does the use of salycilic acid injure cider for making vinegar?

H. M. Dunlap — No, not in the least.

Prof. Burrill — What is the effect on the human system?

H. M. Dunlap — The quantity used is so small that it cannot be detected.

Dr. Humphrey — I never give drugs, but have known men who were suffering with rheumatism to buy a barrel of cider preserved with salicylic acid which cured them.

## BEES IN HORTICULTURE.

BY C. L. BOWERS, ELMWOOD.

Bees play a more important part in horticulture than many know, or are willing to allow them. Suppose they do destroy a very little fruit, can we afford to do without them, taking into consideration the great good they do in fertilizing the fruit and berry blossoms? They are accused by some of eating apples, peaches, grapes, and many kinds of berries, and have caused many law-suits, sometimes settled in favor of the bees, and as often against them. Many good men, both in the horticulture and honey business, have taken great pains to decide this vexed question, and have generally decided that, on the whole, the injury bears no comparison to they good they do. They confine their work to over-ripe fruit, or that which has the skin broken from other causes besides the bees' teeth. I have kept bees for years under the shade of Concord grapes, and have never had my grapes injured by them; have watched closely, and know it. In looking up this subject I read of two grape-growers who each kept a few bees. Their grapes were being destroyed by bees, as they supposed, and each one killed his bees, when, too late, they found it was the common wasp and the yellow-jacket that were doing the mischief. Mr. Wasp would tear a strip of skin off the grape, through pure wantonness, not even tasting it; while the yellow-jacket would tear a like strip, and suck some of the juice, as they passed from one grape to another, while the bees followed up and finished the work.

But in a good honey year the bees will not taste a grape if they are mashed and spread out for them.

It don't make any difference what we engage in, we have to bear expenses and losses. Farmers have to keep their teams well fed from the products of the farm, and wear and tear of tools are kept up from the same source; but neither can be dispensed with. So if the bee does more good than harm, there is no other way but to give them the freedom of the patch, for they can't be fenced against.

Most of us know that white clover here, is the great honey plant. From the time the first head is seen in the Spring till the last in the Fall, they are covered with the honey bee, and you can't find a healthy head that is not full of seed, while our common red clover don't seed at all the first crop, but always the second. This can be accounted for in this way: The bumble bee is the only insect that gathers honey from it. I have examined the blossoms of both the first and second crops, and can see no difference in them. The pistils, stamens, and pollen are as perfect in the first as the last. The honey bee is ready, in full force, for the first white clover that comes out.

You may notice the first crop of common red clover in bloom; you will not see anything taking out the honey, while there is plenty of it there — you can decide that by putting a head in your mouth and sucking it. The secret is this: Mrs. Bumble Bee don't set up housekeeping till the last of May, or first of June, and then all alone; and don't get her offspring reared in time for the first crop of blossoms. I will say right here, if anyone in the house knows where she spends her time through the winter, they may add a new page to natural history.

Alsike clover is between white and red clover for size, and bees work on it the same as the white, and the first crop is the seed crop.

Our Mammoth is the largest and latest, and the blossoms are so late that the young bumble bees have gotten to work, and the first crop of the common has been cut, and has not rebloomed, and they are confined altogether to the Mammoth, except scattering heads in pasture fields, and it is mostly well seeded. Mr. Darwin has covered white clover with a screen, just fine enough to exclude the bee, but not fine enough to exclude the air or sun, and found it would not seed. The query with many is, does fruit need insects to assist in fertilizing. Of all berries, the strawberry is the most imperfect and is the least visited by the honey bee, while the raspberry is covered, from morn till night, as long as a blossom remains, and you don't see any imperfect ones from the lack of fertilization. You can see it in the apple and cherry. They visit the former much more than the latter, and apples are not so bad to shed their blossoms as the cherry. We will suppose that each tree and plant supplied enough pollen to vitilize its own fruit; we think the cross from one individual to another, is a great advantage, and that it is done better by insects than any other way. We can't depend on the wind; it may blow

one direction all the time of the blossoming. Some think that bees carrying pollen from one species to another, might make confusion, but one peculiarity of the bee is, it does not mix its nectar while gathering it. When it commences on one kind of flower, it always finishes its load from that kind; you can convince yourself of that fact by watching them. I have seen scattering heads of wheat in a field, that were different from the main crop, and were always better, and have gathered them and planted them separate, hoping to get a superior kind; but separation seemed to take away the superiority that was seen while growing along with the other wheat. Believing bees to be the horticulturist's friend, I will try and keep them for the accommodation of my friends.

Prof. Burrill—The question has lately come up as to the right to keep bees to forage on our neighbors. In California a farmer sued for damages, claiming that the bees were injuring his clover and driving away his sheep. The decision was that they could not be fenced against, and were not, therefore, trespassing.

Mr. Phelps—I think bees are beneficial and play an important part in fertilizing fruit and vegetables. In the economy of nature they have a work to do, and I think we should let the bees and birds alone.

H. M. Dunlap—We should use some discrimination in dealing with these questions. Not long ago I had some pigs so badly stung that several of them died. Robins are a disadvantage to the fruit-grower.

Dr. Lobaugh—The robin sometimes steals a few cherries, but for all that may he not have his use in the world?

Owing to the lateness of the hour and the intolerable heat, the papers of H. K. Vickroy, G. W. McCluer and A. H. Gaston were read by title and referred to the secretary for publication.

Dr. Humphrey, chairman of the Committee on Final Resolutions, presented the following:

REPORT OF THE COMMITTEE ON FINAL RESOLUTIONS.

*Resolved*, That the thanks of the Society are due the citizens of Elmwood for furnishing a hall in which to hold our annual meeting, and for the kind and generous entertainment of our members.

*Resolved*, That our thanks are due to the Elmwood press, which has so extensively published the transactions of this meeting.

*Resolved*, That we are under obligations to the various railroads that have given reduced transportation to and from this convention.

*Resolved*, That we commend the interest taken in our proceedings by the large attendance at our meetings by the citizens of Elmwood.

*Resolved*, That the introduction of music in our deliberations has proved highly gratifying, and that we tender to the Elmwood Glee Club our sincere thanks.

A. G. HUMPHREY,
—— GIBBS,
*Committee.*

President-elect Dennis now briefly addressed the Society, thanking the Elmwood people for their efforts to make our visit pleasant, and urging them to send a good delegation to the next meeting in Champaign.

On motion, the Society adjourned *sine die.*

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## FOREST-TREE-GROWING A NATIONAL NECESSITY.

BY A. H. GASTON, LACON.

In looking forward one hundred years, and speculating on the demand that there will then be for valuable varieties of timber, it becomes us, in our generation, to try and supply, at least in part, the coming need. For the past hundred years our natural increase has been 33 per cent. There is no reason why we should not, in the next hundred years, increase in the same ratio. This will give us a popution of at least 400,000,000, or eight times our present population. For this reason we will need eight times the present number of buildings, railroads, bridges, etc. It is a good thing for our arboriculturists, or forest-tree planters, to educate the masses of the American tree planters as to what varieties of forest trees will pay the best. We are convinced that there is no investment of land, money and labor which will increase the individual, state, or national wealth as fast as the time and money spent in the planting of our most valuable varieties of timber.

Below is a select list of varieties that we would recommend to tree planters as the most valuable: Black Walnut, Hardy Catalpa, Black Locust, Black Cherry, Osage Orange, Burr Oak, Shell-bark Hickory, Pecan, Hard Maple, White Pine, Black Birch, Balsam Fir, and White Ash. The above mentioned "baker's dozen" varieties all have a money value in the timber, and can be grown in some part of our nation, from Southern Florida to Northern Dakota. We can make a safe estimate, in growing Black Walnut timber, that in all trees planted and well cared for until one hundred years old, the timber and stump will bring at least $100, and that the nuts they bear will pay the rent for the ground the trees occupy, after the first ten years. In planting one acre of walnut trees thirty feet apart

each way, it takes forty-eight trees. This makes one acre worth, in one hundred years, $4,800; ten acres in the same ratio will be worth $48,000; one hundred acres will be worth $480,000, and one thousand acres will be worth $4,800,000. This arithmetical calculation, carried out from one acre to one thousand acres, looks fabulous, but figures will not lie, and so we must take the dose, bulky as it seems to be. The hardy catalpa is a flowering, ornamental tree, of very rapid growth, and makes the most durable wood that we have for fence posts, railroad ties, telegraph poles, piles, and like timbers. It is not a root, but is a stump-sprouting tree, and can be cut off every ten, fifteen or twenty years, reproducing itself each time very rapidly.

We are now convinced that the black locust is to occupy a conspicuous place among the forest trees of America. Once we thought it was to be entirely destroyed by the borers, but of late years they do not disturb it much. The locust is peculiarly adapted to the washy ravines of our country, and also to the broken or mountainous parts of the United States — in fact, is hardy wherever any other tree will grow. It is a root sprouting tree, and, like the hardy catalpa, reproduces itself and is a most valuable wood for such purposes as railroad ties, fence posts, etc.

The American black cherry is a rapidly growing tree, the timber being of well known value for cabinet-making purposes. The fruit is also valuable as a feed for birds.

The osage orange is a highly valuable timber on account of its great durability of wood, which is used in the manufacture of wagons and agricultural machinery, as well as for fuel.

The burr oak is another of our useful forest trees. The timber is quite durable, while the nuts for feeding hogs, sheep and deer are almost as good as corn.

The shell-bark hickory is a tough and hard timber. The nuts will always sell, and the wood is the most valuable timber for fuel there is in America.

The timber of the pecan tree is similar to that of the hickory, the nuts having also great commercial value.

The hard maple has no equal as an ornamental tree for parks, streets, and lawns, while the sap is unequaled in the manufacture of sugar and syrups. The lumber is largely employed in the laying of hard wood floors and for cabinet purposes, the wood coming next in value to hickory for fuel.

White ash is another valuable timber in the line of flooring and the making of agricultural machinery. The black birch is a tree which is coming very rapidly into notice, being so completely hardy that it can be grown in the coldest portions of the Union, or as far north as the hardiest varieties of pine will grow. The wood is as dark-colored as mahogany and puts on as smooth a polish, judging from the reports which are being made in its favor. (It would be well for our foresters to look after this new acquisition to the list of our valuable American forest trees.)

The merits of the white pine, in a measure, have in the past been overlooked, although it is one of the most common of American forest trees. In planting, they can be set one rod or less apart, around and across a new, rich prairie farm — their peculiar habits being to grow upright when standing alone or in rows — each year, with good care, making a growth of from one to two feet, thus making a tree when fifty years old standing from fifty to one hundred feet high. Its limbs shoot out all around the trunk, from bottom to top, with from four to eight branches, all in one ring, the rings being from one to two feet apart, usually. The lower limbs can generally be braided together, and will grow in this manner, making a permanent fence, as each limb from bottom to top grows in a horizontal position. Our opinion now is that a white pine, with good care on our rich, prairie soil, can, in one hundred years, be made to grow from one to two hundred feet high, having a circumference of fifteen or twenty feet and, moreover, each tree making from twelve to fifteen saw-logs, each twelve feet in length.

The balsam fir tree is very similar in its habits to the white pine, being symmetrical in form and retaining its beautiful green foliage throughout the winter.

There are a number of American forest trees which we would *not* recommend for cultivation, if money-making were the object. Among these are: The soft maple, box elder, linden, hackberry, willow, elm, silver-leafed poplar, sycamore, cottonwood, beech and gum.

Many of the above named varieties are of some use for street, park and shade trees, but have no especial value in a commercial point of view. In forest-tree planting, we should always make the inquiry: Is there any money in the timber after it is grown?

It was the writer's fortune to be born and raised for the first thirty-five years of his life in one of the dense forests of Central Ohio, and so have had a practical acquaintance with most of the above named varieties of timber, and hence profess to know whereof we speak. It is said that every tree planted is a living monument to the planter. Let us all have some monuments!

## STRAWBERRY NOTES.

BY G. W. M'CLUER, CHAMPAIGN.

The following is taken from notes made on strawberries the past season, and is likely to be somewhat fragmentary:

On the 9th of April, we were burning some weeds along the side of a patch of about two acres of strawberries, and the mulching caught fire, burning over most of the patch. We thought that would be a good time to try the effect of cultivation, so the burned part was plowed with a two-horse corn cultivator, and then harrowed.

We then put on another mulching, just sufficient to keep the berries clean.

The plants had started to grow before they were burned, and the fire gave them a pretty severe check. They began blooming five days later than those not burned, and the first ripe berries were four days later. In two plats of the same size, those not burned produced seventy quarts, while those burned produced forty-four and one-half quarts. In size, those not burned were a very little larger than the others. Those of the burned part, although later in beginning to ripen, did not last any longer than the others. I did not expect to get as large a yield from those cultivated as from the others, because too many plants were destroyed in the operation; but I did expect finer fruit. Our season of picking, this year, compared with the two preceding, was very short. In 1885, it was from June 6th to 30th — twenty-five days. In 1886, from May 28th to June 16th — twenty days. In 1887, from May 31st to June 15th — sixteen days. Our fruit is grown on the black prairie soil. One of our neighbors, Mr. J. G. Thompson, is growing fruit on a white timber soil. Mr. Thompson began picking, this year, eleven days before we did.

We have, this year, only sixteen varieties of strawberries that have fruited. Of these, the one we are growing most of, we are not sure of the name. Until two years ago it had been called Crescent Seedling, but it differs from that in the plants being more robust, the leaves larger and broader, and darker green. The fruit is larger, lighter colored, and more rounded in outline. It does not set so much fruit as the Crescent, and the later berries are apt to be imperfect and knotty. I sent specimens to O. B. Galusha, of Peoria, and Matthew Crawford, of Cuyahoga Falls, Ohio, for names, but neither of them knew it. Prof. Burrill and H. K. Vickroy think it is Green's Prolific, but are not certain. A. S. Fuller describes Green's Prolific as being a perfect berry, while this is a pistilate. It is an easy berry to pick, because the stem is so brittle that it breaks off without any difficulty.

The Bidwell bears a full crop of good-sized berries. They are smooth, nice-looking, firm, and of fairly good quality. This year they began ripening at about the same time as the rest, but we could get berries from them for three or four days after the others were all gone. They are good strong growers and nearly free from rust.

The Piper bears a very full crop, and the first berries are of fair size, but toward the last they get small. When fully ripe they are highly colored and of very good quality. The plant is a good grower and hardy.

The Sharpless is too well known to need much note. It does not produce many berries, but they are large, and when ripe all over they are very good. It is not as much of a plant to spread as some of the others, but is hardy and free from disease.

The James Vick has a very pretty berry, highly colored and of good flavor. The plant is a vigorous grower, very healthy, and produces lots of runners and lots of bloom; but the later blooms seldom set fruit, so it is a poor cropper. The fruit stems are very tough, and they seem to separate from the berry more easily than in most other kinds, so it is hard to get all of them picked with stems on.

The Capt. Jack produces fewer runners and fewer blooms than the Vick, but it sets more fruit. The fruit stems are tough, as in the Vick.

The Kentucky is a late berry, and that is its only recommendation. It does not bear a large crop at any time, and this year it was not worth picking. It rusts rather badly and is not a very good grower.

The Wilson with us is not a strong grower. Under our system of keeping the same bed several years, and cultivating each year, the Wilson rows will, in three or four years, be half gone, while most of the others remain full.

The Glendale is another that does not stand the "year after year" system very well. The plants rust too much, the calyx is too large and is apt to be dead by the time the berry is ripe, and the point of the berry stays green too long. It is of good quality, bears very well most years, but don't sell well.

The Longfellow is a very pretty berry; of fair quality, but it is worse than the Sharpless about ripening, the lower side remaining green after the upper is fully turned. The plants produce but few runners. Only one kind, the Old Ironclad, is hurt any worse by the drouth of this summer.

The Jersey Queen is a very good grower, comparatively free from rust, does not produce many berries, but they are of good size and fair quality.

Sucker State is free from rust, and a very strong grower, but the fruit is not very notable for anything. If I had it growing with a lot of seedlings, I certainly should not pick it out as one to be saved.

The Charles Downing is not very vigorous, and shows rather too much rust. The berries are of medium size, very good; not much of a crop this year. Some years it bears a good crop, but never anything like Crescent.

Windsor Chief with us is a very weak grower, and does not produce much of a crop, though Mr. Thompson has been growing it in his white timber soil with considerable success.

Old Ironclad stands the winters well, is a strong grower, and free from disease. A medium-sized berry of good quality, but not enough of them. The plants at present are nearly all dead from the drouth. They are affected worse than any of the rest.

Bubach's No. 5 I have been a little disappointed in. With the same treatment, it was no larger than Sharpless or Jersey Queen, or Glendale, and did not produce any more fruit than Sharpless. It

seems to be a vigorous grower and free from disease. Mr. O. B. Galusha and Mr. Matthew Crawford advised us to grow that in preference to anything else, but I understand that Mr. H. K. Vickroy, who has about three acres of it, wishes he didn't have it.

## CULTURE OF SMALL FRUIT.

BY H. K. VICKROY, NORMAL.

*Mr. President, Ladies and Gentlemen:*

What I have to say on the culture of small fruits will not be new to most of you, if to any one, as I know you have practiced methods equally as good, if not better, than mine. What we want to know is, how to grow maximum crops at a minimum expense. One thing we all know, and that is, there is too much poor fruit grown and put upon the market. To remedy this, reduce our acreage one-half and increase the yield at least one hundred-fold, by giving better preparation of the land, thorough cultivation, more care in gathering and marketing the fruit, which will give more money and satisfaction to the grower, dealer and consumer.

If I were giving instructions to beginners in small fruit growing, I might possibly say something that would benefit them, but to intelligent and wide awake fruit-growers, I hardly know what to say that would be of any value.

Possibly there are some in this audience who are anticipating engaging in small fruit-growing and have had no experience. To those I will say that the preparation of the lands for the reception of the plants is of vital importance, for upon this depends success or failure. Where the land is not naturally well drained, it should be by tile-draining. The ground should be pulverized to a depth of from twelve to fifteen inches by plowing and sub-soiling, enriched with good barn-yard manure, if not already so, to produce one hundred bushels of corn per acre.

For strawberries, I think it is better to apply the manure one year previous to planting, unless the manure is very fine and well rotted. For blackberries and raspberries the manure can be applied after planting. Our best blackberries have been produced on high and poor ground, enriched with good yard manure after planting.

The ground should be cultivated thoroughly and often, and the first season deeply in the early part, gradually working shallower towards the end of the season. We cultivate blackberries and raspberries until the middle of July, sometimes later; strawberries, to the first of November.

One-horse turning-plow after the first year, for cultivating blackberries and raspberries, have given us the best satisfaction. We plow about two to three inches deep once a week, throwing the furrows to and from the plants alternately.

I would like to call your attention to the "Hamilton Adjustable-Arch Bar-share Cultivator," made at Hamilton, Ohio, which I think admirably adapted to the cultivating of corn, working in the garden and among small fruits. It can be adjusted to any width of row very quickly, and the beams and wheels so changed to run up close under blackberries and raspberries, and throw the dirt to or from them.

The thinning and pinching of the growing canes during the growing season, and the cutting back of the ripe wood of the blackberries and raspberries, are sadly neglected in most plantations. I think there is more poor fruit from this neglect than from any other one cause. Three or four canes in hill, three to four feet apart in the row, are sufficient.

The young growing shoots, or canes, should be nipped — the top pinched out — when they are two to three feet high, and only once, unless the laterals come out very strong, when they should be nipped at ten or twelve inches. These laterals should be cut back in the spring from one-fourth to one-third.

When strawberries are grown in matted rows, the plants should be at least four inches apart. If you want buttons, let the Crescent grow as thickly as they will in the rows, and you will have them, Thrips or no Thrips.

If I could only tell you how to grow two strawberries as large as the pictures of them in some catalogues, or shown in plates by tree peddlers, where only one poor little berry grew before, I would gladly do so.

My advice to every one is, don't plant a foot of ground more than you can thoroughly prepare, cultivate, thin, pinch and cut back, carefully gather, assort, pack and market the fruit.

I think there is one thing we will have to adopt and practice, in order to grow the best fruits — that is, irrigation, either sub or surface. We know where they have to entirely depend on irrigation, they grow the finest fruits in the world. I know you will ask at least two questions — one is, Where will you get the water? and the other is, Will it pay?

To the first, I will say we can get the water by tile-draining our farms and collecting the water into reservoirs, in suitable places from the surface, and through the tiles. This water can be pumped by steam or wind into a reservoir, or tanks on the highest points, and distributed over the farm as needed.

To the second query, I will say I don't know.

I think it would be well to suggest to the parties having control of our Experimental Station, to try this experiment, and see how much water they can collect from an acre of land, and distribute, and the cost.

## HYBRIDITY IN THE ALMOND FAMILY.

BY D. B. WIER, LACON.

In looking up the fertilization, or pollenization, of the flowers of the native plums, I have gathered some queer fancies, or theories, perhaps facts. They are mostly founded on careful personal observation, be they facts or not.

All of our cultivated stone-fruits are included in the Almond family. All of these have so-called perfect flowers, which means flowers with perfect, regular sexuality — flowers which have the male organs, *stames*, and female organs, *pistils* — fully developed in each flower, and each flower capable of fertilizing or pollenizing its own ovaries, and it has usually been considered that each flower does perform this function for itself. But my studies of these flowers have convinced me that they are not usually fertile with their own pollen.

I do not mean by this that I consider no flower of this family capable of being fertilized with its own pollen, but I conclude from observation that the flowers of the family, and of the whole order — roseaceæ — to which it belongs, are, as a rule, more fertile with pollen from another flower on the same plant, or that from another variety of the same species, and, in some instances, as is certainly the case in the tribe prunus of this family, from another *species*.

Botany is considered an exact science, founded on absolute laws; but the student will soon find that it is exact in nothing. That is, he will find exceptions to all, yes, I may say all, rules and laws, or very nearly so. Therefore, many of us have been tied, hand, foot and mind, in our studies of vegetable life. That this is true, and a great drawback to our full understanding of nature's ways, I could go on and give absolute, abundant proof. Therefore, I ask, that for a time, you all lay aside these laws you may have thought unbending, and follow me a little through this great order the roseaceæ — the Rose family, or parts of it, untrammeled; a word more to help free ourselves from notions we may have formed. In the Science of Botany there is hardly an example, however strange and inconsistent with the general laws of the science, but what we will find as an existing fact, if we search far enough. One solitary example will give you plainly what I mean by this. It is this: We have all of us believed, have we not, that a plant is incapable of maturing good seed without the intervention of pollen, or the male element. Yet, plants have done so in many instances. Again, we all know that it is a very general law that a tree dies above that part when a section of the bark several inches wide is entirely taken away all around its trunk. Yet a tree has been known to live in that condition for years. Therefore, please do not consider some of my observed facts here given as impossible.

I have absolute, abundant proof on my place that nearly all the native plums are infertile with their own pollen, that they will mature no fruit at all when isolated from other varieties and species of the Almond family. I have also positive proof that most of the different so-called species of plums, both foreign and native, intercross or fertilize each other's flowers.

I have a tree grown from a wild or native plum (species, *P. Americano*) pit, that has the wood and branches of the wild plum; leaf a mixture of the wild with the European plum; the fruit is the size, color and shape of the Blue Damson; skin like the wild plum; pulp very like the Damson, also the seed. This would be a very valuable plum if the skin of the fruit was not so acerb and bitter.

In the variety known as the Langdon we have exactly the same kind of a cross of the European or garden plum with the wild plum of the south *(Prunus Chicosa)*, but in this instance the skin of the fruit is thin and without bitterness, resulting in a very fine and very profitable fruit.

As a very common instance of such crossing we have an example in the well known Wild Goose plum, a supposed pure variety of the Chickasaw group, and the Miner, a very nearly pure variety of the northern group. These two varieties with me, when growing entirely isolated from each other or any species of the Almond family, have not for twenty-five years matured a perfect specimen of fruit, but the same two varieties, when growing quite near each other, mature most abundant crops nearly every year. I have trees of both that the past season gave their nineteenth full crop in succession. Seedlings, therefore, grown from the seed of trees of these two varieties, growing in this way, near together, should be crosses between these two varieties or species. They are. I have grown thousands of such, and they show perfectly typical plants of both species and every gradation in all particulars between the two.

A careful experiment, carried through to test the fruit from 120 of such seedlings, showed the fruit all to be fairly good, some trees giving fruit of extraordinary beauty, size, goodness and value. It showed, in this case, that seed from the Miner gave far better fruit and trees, than than that from Wild Goose. But one example proves but little.

The Spring of 1886 I carried branches of the Miner, in bloom, and placed them in isolated trees of Wild Goose and Newman. Such bore a full crop of fruit that season. None other of the isolated trees did. This seems to be proof positive.

For several years I had a large mixed cherry orchard, largely seedlings. This was bordered on two sides with Miner and Wild Goose plums in orchard — trees ten and twelve feet from the cherry trees. The two varieties — or we may say species, unmixed except at one point. With the exception of at the point where the two

plums were growing together, not one tree of the whole 1,200 ever matured a plum, except the trees next the cherry trees, around the whole margin for eighty rods or more, matured a few fruits on the side of the plum trees, next the cherry trees, each year for many years. In these facts we have very good proofs that the pollen of the cherry can, to some extent, fertilize the ovaries of the plums. If I had been as crazy about the Almond family then as I am at the present time, those plums around the margin of that cherry orchard would have been very carefully examined, and the seeds planted; yet, very likely, I should have produced nothing from them but plums, as I will try to show further on.

Let us see if it is not probable we now have a cross between the cherry (*Cerasus*) and the plum (*Prunus*). My first glance at the Mariana plum caused me to think that it might be such a cross. When I learned the habits of the tree, and had seen it in fruit and foliage, I felt confident that, instead of having European sloe "blood" in its make-up, it had Kentish Cherry blood. I wrote Mr. Ely, the introducer, asking him if, in the orchard where the Mariana sprung up as a seedling, there were any European plums or cherries in fruit about the time the seed was produced. He answers that he "could recollect of no foreign plums in fruit, but there must have been a good many cherries." A careful examination, by any expert, of the tree and fruit of this plum, will show him that it has several points peculiar to the cherry, and found, I think, in no other plum.

In the Blackman plum we have a complete mingling of the wood and foliage of the peach and Chickasaw plum. Some had, therefore, called it a hybrid between those two quite distinct species. In fact, it undoubtedly is. But our doctors in botany disputed this "flat-footed;" put themselves on record, saying such a thing was not only improbable, but impossible.

T. V. Munson, of Texas, a pretty good authority, bobs up and says it is not impossible; further, that he has now growing several such hybrids, produced in such a manner that there could be no mistakes.

Have we no other such hybrids in cultivation? I think we have—dozens of them; some of them of great value.

The peach went on, generation after generation, for hundreds of years, in its own staid way. In tree, fruit and foliage, it followed closely in its own peculiar lines. For generations it had given us no variety earlier than a certain date. All at once it gave us a variety twenty days earlier than any before known—the Hale's Early. In a few years more it made another long jump, and gave us varieties twenty days earlier than the Hale. Alexander, Amsden's June, etc., were produced. What had happened to the staid old peach? It had simply got mixed up in a love affair with the sturdy, very early, Chickasaw plum.

Is there any proof of this, or is it mere theory. The best of proof — positive proof; for Mr. Munson says he has produced such hybrids by manipulation, and has them now growing. As further proof, let anyone take any of these very early so-called peaches, and examine them critically, and he will find the fruit a complete mingling of the Chickasaw plum and the peach. Their pits are so different, all of them, from the normal peach pit, that one can readily select them all out if mixed with a lot of regular peach pits. They are nearly smooth, like a plum pit; also rounder, lighter in color. The pulp of the fruit is nearer like the plum than the peach, etc., etc.

Now a few words on the power, or prepotency, of the pollen in changing the fruit that is to follow in a greater or less degree, and I will leave you.

I have seen the flowers of one branch — a graft of a large, fall, yellow Russet, that had been inserted in a Willow Twig apple tree, in an isolated block of Willow Twig trees, change every apple on the tree in which the graft grew, and on the six trees nearest to it, and more or less, change the fruit for five trees, or over one hundred feet in one direction, probably toward which direction the wind was blowing when the pollen was ripe. Some of the apples that grew on the Willow Twig were as perfect Russets, in every particular, as any that grew on the Russet graft; others showed every gradation between the two varieties, possible. The Willow Twig trees within the influence or reach of this pollen, matured from two to four times as much fruit as the other trees in the block.

I made careful observations of a case where a Domine apple tree stood in a block of isolated Willow Twigs. I could notice no difference at all in the fruit on the surrounding Willow Twigs, except that it was a shade larger and very much more abundant than on any other trees in the orchard. In two cases where Willow Twig was in fruit next Jonathan, and another Roman Stem, such Willow Twigs were exceedingly productive. When growing near Jannet, which blooms some days after the Willow, there was no abnormal increase of fruit, very strongly, to me at least, Jonathan, next Willow, showed more fruit.

A row of Rambo, next one of Maiden's Blush, for years had its fruit changed in color and form like Maiden's Blush, otherwise unchanged.

150-trees of Yellow Bellflower, that were unproductive, were grafted with Red June and Red Astrachan, each tree partially. So soon as the grafts bloomed the Bellflower began to bear good crops; this apple is generally nearly seedless. The fruit produced after grafting had abundant, plump seed, exactly like the grafts; no other being observable in the Bellflower fruit. We at one time grafted Rhode Island Greening in the tops of about twenty strong, vigorous seedling apple trees; the grafts were all taken from one tree. When

they fruited we had nearly twenty kinds of Rhode Island Greenings; they all had very nearly the proper color and form, but they ripened on different trees from August 1st to mid-winter. On some trees they were very large, on others quite small. Here in this we have a case of what has generally been called, and thought, a change or changes brought about by influence of the stock.

But I am confident this is not correct. The change was caused sexually by pollen, for I had a small block of this variety on which the fruit was all alike and ripened regularly in September. I might go on with such examples among the apples to an almost unlimited extent. But I will only give one more, which will prove that as yet we do not know how to get the best results from the apples. I had some rows of apple trees eighty rods long; through the middle a row of one variety ran clear through, next to it was another variety running half way through. The trees in the long row for several years bore immense crops of perfect apples so far as they were beside the short row; beyond that point they did not average more than one-fourth as many apples, and these were much smaller and poorer. Yet this same row had other varieties on each side of it all the way through, and the trees, soil and exposure were much the same. These facts seem to prove that, to have abundant crops of apples, we should plant trees in the same way that we must the native plums to get crops, namely, many varieties near together, all mixed up. And then, when I add to the above last mentioned case that the trees of the long row, next to the short row, were in every way the most vigorous, healthiest and best, and remained so, notwithstanding their heavy fruitage, we are forced to believe that plenty of acceptable, satiating, potent pollen does have an effect on the vitality of the whole tree.

I have as yet noticed but one marked change in the fruit of any of the native plums caused by pollenization. In that case two varieties of large, dull yellow plums, of a distinct race, were changed in color to a dark bright crimson, caused, I suppose, by the pollen of a tree of another species of native plums of that color coming into bloom near them. This, though, was the only change observable in them.

The Newman is larger, later by a week, darker colored, and has its skin considerably thickened and rendered a little bitter if fully pollenized by the Miner.

From all these facts we may conclude:

(1.) That pollen is often pre-potent, and often has the power to formulate the fruit completely or in part, and that it sometimes effects the vitality of the whole tree for better or worse. We should say in the line of its congeniality or non-congeniality.

(2.) That we must not conclude that a fruit, especially a new one, growing and fruiting in a certain location, surrounded by many other varieties, will remain exactly the same — just as fruitful and

fine — when we remove it to another locality, or plant it isolated in another place. I have noticed some remarkable changes in seedling strawberries by a change of its environment.

(3.) That nearly all our fruit trees that have perfect or regular flowers, such flowers are often polygamous in character, and non self-fertilizing, and that often the pollen from another variety, or even an allied species, is the most potent and congenial, and clearly explains why our keeping-apples sometimes do not keep.

(4.) That the facts here given are the exception, rather than the rule, in all cases, except those given of the native plums, to which we will now return for a few moments. So far, I have found but one of these that that is fairly and regularly productive, when not near other trees of the Almond family.

So far as tried, all varieties of native plums are pollenized by the Miner, and it by them. This plum seems to have most potent pollen seedlings, grown from seed of the Wild Goose, pollenized by it, much more nearly resemble the Miner than they do the Wild Goose. In fact, they show much less Chickasaw "blood" than those from Miner seed, grown near Wild Goose.

In the light of these facts I think it is evident that if we wish full success with the native plums we should plant them in rows not more than six feet apart in the row, with every third tree a Miner, the rows twelve to twenty feet apart.

That the almond family can be, in a measure, broken up by hybridism, and the species run together and many new and valuable points produced in that way, I have no doubt.

The experimenter will meet with many set-backs and failures, but we should keep on trying. In the line of discouragements, let us glance at the so-called Blackman plum. This seems to be entirely infertile with its own pollen, and it may be also with nearly every variety and species of the almond family, and fully fertile with only one or a few. It may be fertile only with the pollen of certain peaches. It certainly did fruit quite freely in its first environment, where it grew from seed. Now, to get a new race of hybrids between the plum and peach, we should find out what the Blackman is fertile with, so as to get seedlings from it. We should bud the peach on isolated trees of such varieties of all our species of plums as are known to be infertile with their own pollen, and if we get seeds, plant them, and not be discouraged if such seeds give us seemingly perfect peaches or plums. Why should we strive for hybrids between the peach and plum? Simply because the plum tree is hardy, and it has hardy fruit buds, and both species have fine, useful fruits. As an example: I have a tree that one might eat of its fruit, and critically examine the tree, and call it simply plain peach; yet I have no doubt but what it is a good hybrid between the Snow peach and Wild Goose or other Chickasaw plum. Why? Because its blossoms are small, pure white; its pit nearly smooth, and it suck-

ers freely from its roots—the only case of the peach suckering I ever heard of,—and the tree withstood, with very little injury, 35°. But, unfortunately, its fruit buds are killed by 26°. Here we have a very hardy peach tree, bearing very choice fruit, but without what we want most, namely, hardy fruit buds.

The Wild Goose is undoubtedly a hybrid between the peach and Chickasaw plum.

# Proceedings of the Monthly Meetings

of the

# ALTON-SOUTHERN ILLINOIS HORTICULTURAL SOCIETY.

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*Reported by E. A. RIEHL, Secretary.*

## OFFICERS FOR 1888.

*President* — J. S. Browne, Alton.
*First Vice-President* — E. A. Riehl, Alton.
*Second Vice-President* — J. Webster, Centralia.
*Secretary* — F. C. Riehl, Alton.
*Treasurer* — S. F. Conner, Alton.
*Librarian* — H. G. McPike, Alton.

PROCEEDINGS

OF THE

# Alton-Southern Illinois Horticultural Society.

REPORTED BY E. A. RIEHL, SECRETARY.

## APRIL MEETING.

The Alton-Southern Illinois Horticultural Society met at the residence of the Hon. J. H. Yager, in Alton, on Saturday, April 2, 1887, J. S. Browne, presiding.

The residence of Mr. Yager is beautifully situated on the corner of Ninth and Langdon Streets, on ground well laid out and well cared for. Nature seems to have aided the owner in his efforts to improve this splendid piece of property.

### ORCHARDS.

The situation was discussed by all the members, and the conclusion arrived at was, the peach buds are badly injured, on all the tender varieties, but there are yet some uninjured, and if no further harm happens to them there may be some peaches. No other fruits were believed to have been hurt.

The lowest temperature reported was on Sunday morning, Jan. 2d, ranging from 17 to 26 degrees below zero.

### THE CULTIVATION OF FLOWERS.

BY MRS. J. B. LATHY.

I have been requested by your Secretary, to give some hints on what flowers to plant, and how to cultivate them. Though deeply impressed with the fact that my experience is limited, I can but yield a reluctant consent, and briefly relate what I have learned on this subject. As only hints are asked for, I find it the easier to comply with the request. That the cultivation of flowers is something

that well pays one for the time and labor expended in that direction, is beyond all question. Of all the luxuries which mortals enjoy, none are more easily obtained, or more greatly to be prized. We realize this when when we consider that in finding expression for the deepest emotions we turn to the pure blossoms for aid. In their beauty and fragrance they add to the blushing bride the one touch of grace needed, and they alone are found worthy to be placed on the breasts of our dead. One day of each year we, as a nation, are united by them, as we reverently bedeck the graves of our soldiers with the one fitting emblem of our common love—a love that broadens and deepens as time heals the rancor of party strife, until the northern lilies shed their perfume o'er all that remains of the martyred heroes in gray, and the southern roses creep through the grass that covers our own dear boys of the blue. The cultivation of flowers also holds a fascination which few other occupations possess, and they will furnish employment for many hours; though they in their beauty "toil not," we must expend much labor in order to obtain the desired results.

As Pansies are the first flowers to greet us with their bright faces on the return of spring, let us for a few moments consider them. I sow the seed about the first of March in a box, wetting the earth with warm water before sowing, covering lightly with sand, then laying a newspaper over it, which I keep moist and leave on till the plants begin to appear, after which remove and force the plants forward, not keeping too warm and wet, transplanting them while quite small and as soon as the weather will permit or the ground is dry enough, in good rich soil, and where they have the sun at least till noon. I prefer too much sun to a surplus of shade. Keep the earth well worked around the plants, but not filling the crowns with earth, and during intense heat keep moist by mulching. I usually pick off all buds while very hot, which enables them to give large blossoms for fall; or fresh seed might be sown in July or August, in a cool, damp place, for fall blooming. Never let Pansies make seed if you want blossoms, and the more flowers you pick the more you will have. I next sow Sweet Peas (as soon as you do garden Peas), in the place they are to remain in. I would say, by all means have a few Sweet Peas. They will grow anywhere, only give them sun and something to twine themselves around; then pick them without fear if you would have an abundance of bloom all summer, not letting seed pods form. A vase of them will fill a room with their fragrance. They should never be used with any other flower if you would produce the best effect. Drop them in a tall, flaring vase, and they will arrange themselves in a way to delight the eye of anyone who loves beauty. The first week in April I sow Verbenas, Phlox, Sweet Alyssum, Candytuft, Mignonette, Snap Dragon, Pinks and Dahlia seed; the first of May, Balsams, Salvias, Nasturtiums, Asters, etc., transplanting as soon as large enough and

the weather is warm. I never wait for a rain, but fill the place for each plant with water, drawing the dry earth around the plants. I have mentioned Dahlia seed, because last year I raised some fine ones from seed, both double and single, and they blossomed about as soon as those from bulbs. I enjoy the surprises which each plant brings on opening, having my bulbs, of course, besides. I must have Balsams, and have succeeded in keeping them as double as roses for years by saving the seed from the center stalk of the plant. All small shoots should be pinched off, leaving only the strongest to grow, and one need have no fear of digging in too much hen manure, if well rotted, if the best success is desired.

Geraniums, I think, give more bloom by being at least a year old, and given good soil and the faded flowers picked off, they are constantly filled with blossoms.

My experience with Tea Roses is limited to two years. However, I am proud of my success, having roses constantly during all last summer's heat. The first of May I set the plants in well-enriched ground, they being very small, and kept them growing rapidly by working the earth and keeping as cool and moist as possible. During the heated term I mulched with straw from the stable. I love all Roses, but the Etoile de Lyon and Perle de Jardins are especially fine, both for buds and bloom, and one is always sure of Roses. Both of these are yellow, so I will add La France, Bon Silene, Sour dun Ami and Hermosa for pink; Presse Guillot for red; Michael Saunders for crimson, and Mad. Rachel and Cornelia Cook for white; the pretty blue Browallia and Forget-me-not, the Calliopeis and California Poppy. Eschœholtzia plants spring up without any labor on my part, and in a mixed bouquet are just the flowers needed, the vivid yellow brightening up all the others like a touch of sunshine.

Among the many hardy plants that are found in every garden are Tulips, Hyacinths, Narcissus, Lilies of the Valley, and the many kinds of lilies; with Gladiolas, Tube Rose, Caladiums and Cannas; nor must I neglect mentioning Chrysanthemums, the most popular and highly-prized flower of autumn; lighting up even dull November with its gorgeous display of crimson, bronze and gold.

But I ought not to trespass on your time longer to touch upon the various shrubs, hardy roses, or the lovely Clematis and other vines, for, the list might be extended indefinitely, and it would be almost an endless task for me to write all I would say on flowers.

One thing I will add, we do not gather enough flowers, thereby losing much pleasure in the cultivation, and failing to give enjoyment to those who are less fortunate than ourselves. We also are the losers in not having nearly so many blooms as we otherwise would, and plants are never so thrifty as when one picks flowers constantly. I never let any plant make seed, only as they may be needed for future use, as it exhausts them.

Make a study of flowers as they grow, care for them, love them if you will, for Ruskin has said: "That flowers only rightly flourish in the garden of some one who loves them."

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## MAY MEETING.

The Society met at the residence of Mrs. Nicholas Challacomb, May 7th.

### ORCHARDS.

Apples were reported as blooming sparingly and the prospect is that the apple crop will be small. A few peach blossoms were reported. Pears blossomed full.

### VINEYARDS.

J. S. Browne—It is time to be getting bags ready, as they will soon have to be put on as a guard against rot; but even if there is no rot, it will pay to bag, as the bag will protect against injury from insects and birds, and bunches bagged are much more handsome than those not bagged. Five hundred to one thousand bags can be put on per day per hand, at a cost of one-half to one cent per pound.

### SMALL FRUITS.

All small fruits were represented as looking well, except some old patches of Gregg raspberry. The universal testimony was that it is not best to attempt to take more than three crops of fruit from a plantation of Gregg. Other varieties will do well one or two years longer.

The Secretary read the following:

### BIRDS AND INSECTS—WHICH TO KILL AND WHICH TO PROTECT.

BY E. A. RIEHL, ALTON.

This subject is too large to be fully discussed in a paper like this, but as the question is often asked, I will give some thoughts on the subject.

Why kill either birds or insects, and when? We, as fruit growers know, to our sorrow, that both birds and insects, at times, do us

great damage; and some persons come to the conclusion that we must wage a continual war of extermination against these foes. I, for my part, do not think so, and have followed a different course. I make war only on such birds and insects as do me a positive injury, and only at such time and so long as is necessary to protect myself from loss by their depredations. Most birds do us so little damage that the good they do probably overbalances the harm, and in my experience of over twenty years, I have never made war on but two kinds of birds, the cherry bird or wax-wing and the oriole, both of these I have killed by the thousand, and find that a No. 12 bore breach-loader, with plenty shell, loaded with No. 10 shot in the hands of a boy ten years old, is about the best means to do it with. But as indicated above, I do not kill birds of any kind, except when I can, by so doing, protect my crops. There is, however, one exception to this rule, and that is the English sparrow. I kill them wherever I can find them on my place, as I prefer the native birds, which the sparrow will drive off if allowed to do so.

There are some birds that never do us any harm, and should be encouraged to breed on our premises. Foremost among these I consider the wren and bluebird. These can be encouraged to do so by putting up boxes for them to nest in, where they will be secure from their foes, especially the cat. Crows and hawks should also be protected, which to some may seem strange, as by many these birds are considered great nuisances. The crow, I think, never does us any harm, except when he pulls some late planted corn, which can be easily prevented by planting the corn so deep that the grain will not pull up with the young plant, or by tarring the seed before planting. The crow is a knowing bird, and, like myself, is not so fond of work as to do it when it don't pay; so if he finds the corn is tarred and unfit to eat, or if the young shoots break off and leave the grain in the ground, he will leave your field in disgust and try some other. But, no doubt, you will ask, "Why not kill the hawks? Don't they kill chickens?" I answer, Yes, sometimes; and when they do, I kill that hawk. But hawks live largely on field mice, and should, on that account, be let alone, except when one gets a taste of chicken meat and goes to raiding the barnyard.

I want to speak a good word for the skunk. This little animal, despised and killed by nearly every one, is one of our best friends, living, as it does, almost exclusively on insects; and, unlike most insect-eating creatures, the insects which it eats are largely injurious.

And I want to say, don't kill the snakes, except the rattler, which is the only one in our part of the country that is really poisonous. Snakes are great destroyers of field mice, and do us no harm whatever.

As to insects, I hold about the same views: kill them when they are doing, or likely to do harm; otherwise let them alone. Nature usually keeps up a proper balance in these matters. Some insects

are great foes to the fruit grower and farmer, but some, also, are his best friends, and do more to protect his crops from injurious insects than all the birds combined. Therefore insects should not be killed, except when we know that they are doing, or will do us harm. Therefore the practice of killing insects by attracting them into traps by lights, should never be practiced, for we are as apt thus to destroy our friends as our foes.

Mr. Jackson asked why the blue jay was not on the list for extermination.

Mr. Riehl replied that some thought the blue jay should be killed because he kills the young and destroys the eggs of other birds; but nature intended that he should, in order that birds should not become too plentiful, and in these things it is usually best to let nature alone — she usually manages these things about right.

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## JUNE MEETING.

The Alton-Southern Illinois Horticultural Society met at the residence of Mr. Edward Rodgers, near Upper Alton, on Saturday, June 4th. Mr. Rodgers has a large, and finely improved farm. Horticulturally, he confines himself mostly to apples. The grounds about the dwelling are adorned with various ornamental trees, and a well-kept lawn. Among the objects of special note were an arbor-vitæ hedge on the northwest side of the grounds, giving protection from the cold winds. This hedge was trimmed in admirable shape, wide at the bottom and tapering to a point at the top; a smoke tree (*Rhus Cotinus*) standing alone in the lawn, was in its full glory of bloom, and a striking object. A clump of American sweet chestnuts in one corner of the grounds, are attractive objects, especially to the younger generation, about the first of October. A fine bed of asparagus of about two acres, we were told, had brought the handsome sum of $400 this season.

### ORCHARDS.

The general report was that there was a very small crop of apples in this vicinity.

The general expression was that the Wine Sap is not a profitable apple to plant here; farther south it is better.

## VINEYARDS.

Mr. Browne — Grapes have set well and there is a very good prospect for a crop; I would advise putting on bags immediately, as there is everything to lose and nothing to gain by delay; used two-pound bags, which cost about $1.40 per thousand.

The Secretary recommended the use of wire instead of pins to put on the sacks with, being easier and more quickly put on and holdings the bags more firmly; fine wire, such as nurserymen use to put on labels with, is best; would use one-pound bags for Concord and two-pound for Niagara, Empire State and Goethe.

## VEGETABLES.

Mr. Jackson said he like the Sunrise and Early Illinois potatoes; they are better growers, more productive and earlier than Early Ohio.

Mr. Pearson praised the American Wonder pea for its earliness, productiveness and good quality.

## SMALL FRUITS.

Mr. Riggs — The strawberry crop has been a good deal of a failure, what the cause is, I cannot say; new plantations were the worst; as to varieties, the Sharpless was the poorest and Miner the best; never had any rust on Snyder blackberry, but had some on Lawton and Kittatinny.

Mr. Hayden —All new strawberry fields were worthless this season in Southern Illinois as well as here, and all the good berries that were marketed were from old fields.

Mr. Jackson said the strawberry crop had not been a failure with him. Thought the fault was with the growers, not the season; left his mulch on late and attributed his success to that.

Mr. Riggs — Seeing in the spring that it was going to turn cold, after uncovering my berries returned the mulch and left it on quite late, but they were no better than others.

Mr. Pearson — Have been in Chicago a good deal this season, and the berries have been poor all the season, no matter where they came from. Judging at the other end of the line, the vicinity of Alton had better berries than any other section.

There was a good display of fruits and flowers on the tables, and the committee appointed made the following report:

Your committee find Mr. Jackson exhibits the best collection of strawberries, and Mr. Browne the second best.

Mr. Edward Rogers exhibits Triumph de Gand, and your committee give it the first place as a family berry; classing Mr. Jackson's Champion as second best.

Mr. Wm. Jackson's Jersey Queen is classed as the best market variety.

Mr. J. S. Browne exhibits the best quart of Sharpless.

Mr. William Jackson best quart of Miner.

Mr. J. S. Browne shows the best quart of Capt. Jack.

Mr. William Jackson exhibits the best quart of Downings.

Mr. J. S. Browne and Mr. Jackson, both exhibit a few of the much-praised Jewel, but not enough to pass judgment as to its merit. It looks like a fair average berry.

Mr. William Jackson also shows a fine Ontario (new). It makes a fair show for this season.

Secretary E. A. Riehl exhibits a new seedling of his own production. It being a seedling of the Crescent, fertilized by the Captain Jack. Your committee agreed that it was promising enough to recommend for trial among all strawberry-growers. It resembles the Captain Jack and seems quite productive and a good, firm berry. Certainly its parents are among our most valuable berries, and if this seedling comes up to their standard it is good enough.

Mrs. J. H. Yager presented some very fine sweet cherries, as did Mr. Hoffmeister also. A sight not by any means common this season, as there is almost a failure of that fruit in this section.

Vegetables: Mr. Simms exhibits some fine Kholrabi; also, onions of this season's growth, already plenty large enough for boiling.

Mr. William Jackson showed two varieties of early potatoes (new sorts), viz: Early Illinois and Sunrise. They are of eatable size, and he thinks are earlier and better than Early Ohio.

All of which is respectfully submitted,

F. Hayden,
J. M. Pearson,
*Committee.*

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## JULY MEETING.

The Society met at Mr. Jackson's, July 9th. The day was clear and pleasant, but, being a busy time, the attendance was not large.

### VINEYARDS.

All the members reported much damage from rot. Also, that the rot came much earlier than usual, and destroyed the grapes bagged after the 5th of June.

There was also much damage from mildew on the bunches while small.

Mr. Riggs reported his vines cut down two years ago, as bearing a good crop, free from rot.

Small fruits were reported to be from a fourth to half a crop, with all plants looking well.

Mr. Riggs spoke well of Brandywine, Gregg and Souhegan raspberries. Of blackberries he preferred the Snyder, as did, also, Mr. Vandenburg.

### ORNAMENTAL PLANTING.

Mr. Pearson gave some object lessons, taken from the grounds of our host criticizing the pruning, or rather, non-pruning of some trees planted for shade; recommended the removal of some of the trees in the grove, and the planting of trumpet vines and American ivy about the trees.

Mr. Jackson read the following on the cultivation of the strawberry :

Of the general cultivation of the strawberry, it is useless to name any particular mode. Location, condition of soil, state of the weather, and what is possibly of more importance in this than anything else, are the habits and conditions of the individual. A person may do almost what he pleases with a few rods of strawberries, but when he has so many acres, the conditions are different, and they generally contrive to have a good deal of their own way. The large grower is frequently compelled to consider himself the creature of circumstances, and act as the occasion may require. The one thing necessary at the present time is, in my opinion, to raise choice fruits

with the least possible expenditure. Good tools and a good selection of varieties will go a long way towards accomplishing this purpose. The following I consider best for home use or market, about in the the order named: Jersey Queen, Miner, Sharpless, and Champion.

Mr. Browne — I begin by preparing the ground the Fall before planting, by plowing in all the manure I can; plant as early in the Spring as the ground will permit, in rows two and a half feet apart and one foot in the row; cultivate well the whole season, and keep the runners cut off.

Mr. Fulkerson — I grow only for family use. Plant in the Spring; cultivate well the first season, then mulch in the Fall, and let alone for five or six years before planting again, and get all the berries I can use.

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## AUGUST MEETING.

The Society met at the residence of Mr. Vandenburg, near Jerseyville, August 4th. Mr. Vandenburg grows small fruits for the Jerseyville market, and keeps a general nursery. He is an extra good cultivator, and all his plantations are in the very best condition. As a consequence, he has uniformly good crops of fine fruit, for which he gets good prices at home for all he can grow.

In discussing the merits of the different varieties of the blackberry, Mr. Browne said he did not know what to plant. The Snyder was too small, the Kittatinny rusted, the Lawton was tender and failed to hold its color after picking. He wanted a blackberry that was early, large, good quality, and hardy. He is trying many varieties, and hopes to find such a one.

Mr. Vandenburg preferred the Snyder, of which he got heavy crops, and it sold well in the Jerseyville market.

Messrs. Jackson and Riggs would plant the Snyder.

Mr. Jackson spoke well of the Taylor, so far as it is free from rust, productive and good, not quite as large as the Kittatinny.

Mr. Riggs cautioned planters against getting plants from diseased patches, as the rust will appear in the new plantations and destroy them before they will bear profitable crops, unless the dis-

eased plants dry up as fast as the disease shows itself, in which case there would not be a full stand, and such a patch can not be profitable.

Mr. Riehl said all this could be avoided by planting plants grown from root cuttings. Roots that are affected have their vitality impaired by the disease, and will fail to grow when cut into small pieces, as when made into root cuttings; hence all the roots that do grow and make plants are free from the disease. He knew this to be a fact from actual trial. In 1885 a neighbor plowed up a patch of Kittatinny that was so affected with rust as to be worthless. Mr. Riehl collected a quantity of these roots, cut them into small pieces and planted in nursery rows, and about one-fifth grew, and made fine plants. Last spring he planted about an acre 4x8 feet, and got a fine growth. Up to date not a trace of rust has shown itself. Besides being free from rust, plants grown from root cuttings have better roots and make a far better growth than suckers, and are really better and worth double the price asked for them, compared with suckers as a gift.

Mr. Browne expressed doubts as to the correctness of these views, because he once plowed up a patch of Lawton blackberries, and removed and burned all the roots he could find and planted to corn. Many plants grew, and looked so fine that the following spring he planted them out, but they all rusted and died before they came into bearing.

Mr. Riehl replied that these were not parallel cases. The roots left in the ground by the plow varied from a few inches to several feet in length, and their vitality but little impaired compared to a root cutting of two or three inches; besides, they grow in the rust-infested soil of the old patch, while the root cutting is grown on new, clean land.

## CULTURE AND VARIETIES OF THE RASPBERRY.

BY E. A. RIEHL, ALTON.

From the experience of the past two seasons I cannot be very enthusiastic, for the profits have been very small. Any good land will answer, which should be well prepared by plowing and harrowing. I think, however, that the after cultivation is of more importance than the preparation of the ground before planting. I prefer to plant in rows, both ways, 4x8 feet for Black Caps and 3x7 for the

Reds. Plowing should be done in the fall. After planting, one or two heavy furrows thrown on the plants will prevent heaving. It is best to use plants of the Black Caps from one year from tips. When tips are used they should be planted early in the spring, but where the tips are grown on the premises it is best to let them grow up until about a foot high, then take up with a ball of earth and plant where wanted. In this way a perfect stand can be obtained, a thing almost impossible when planting tips. Another advantage gained when using plants is that they can be planted deeper, and are less liable to be blown over by the wind when loaded with fruit. The first year after planting no fruit should be grown, but the plants cut down to the ground.

The second summer and after, pinch back the young shoots to twelve or fourteen inches in height to make them branch. Never pinch a second time. The following spring prune back the branches to about one foot in length. Of the caps, I prefer Tyler or Souhegan for early, and Gregg for late. The reds I would not plant, as they are less profitable than the blacks; they sell for about the same, cost more to pick and grow and produce less. I consider the Hansel and Brandywine best for market, and the Turner for home use.

Mr. Jackson recommended the Hopkins, ripening between Tyler and Gregg; was hardy and productive, and nearly as large as the Gregg.

Some one asked why the Ohio was left out, and received the reply that it was too small, though hardy and productive.

Mr. Vandenburg plants in hills 2x7, but allowing four to five canes to the hill. Of the reds, plant Turner and Cuthbert. Hansel did well this season. Schaffer's Colossal was recommended by several members for home use and near-by market.

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## SEPTEMBER MEETING.

The Society met "under the elms" at Dr. E. C. James' residence, in Upper Alton, September 1st. The day was clear and pleasant, and there was a good attendance of members.

The show of fruits, flowers and vegetables was very good for the season. Among fruits, grapes and pears were in strongest force.

Mr. Browne showed a small but well-grown collection of grapes.

Mr. McPike made a fine display of the older grapes, such as Catawba, Concord, Norton's Virginia, Rulander, Delaware, etc.

Among the newer varieties exhibited, Niagara and Jewel were much admired for their good quality and handsome appearance.

Mr. Browne read a paper on grapes, which, being much the same as that read before the State Society, is here omitted. (See page 84.)

Mr. McPike said that after growing grapes for over twenty years, and much study and experimenting he could now say that the Norton's Virginia and the Cynthiana were the only grapes we could plant here, and be sure of getting annual crops free from rot and mildew. Yet, all things considered, the Concord is the best grape for us to plant until some other grape has been tested and proved superior. Some others, like Goethe, Brighton, etc., can be laid down to protect from the cold, and bagged to prevent rot. These tender grapes are usually of the highest quality and well worth the extra care and trouble necessary to grow them successfully.

Mr. Riehl agreed with Mr. McPike that Norton and Cynthiana were the only varieties that we could always depend upon as being hardy and healthy, but they are small and ripen late, so as to be unfit for profitable market culture here, where early grapes paid the best. Had fruited Jewel three years, and so far it has not winter killed; was entirely free from rot until this year, when the rot commenced unusually early, and attacked even Cynthiana and Norton. He believed that in any ordinary season it would be entirely free from rot, being very early, hardy and healthy, and of the highest quality; he believed it would be very profitable. Had fruited the Niagara two years, and considers it the best white grape we now have. It is hardy, healthy, very good quality, large and handsome, the only white grape that does not rot as it ripens. It will be too late for shipment north, but for home use and local and southern markets believe it would give great satisfaction.

Mr. Riggs reported Concord vines cut down to the ground in '85 as bearing a good crop of fruit, free from rot.

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## DECEMBER MEETING.

The Society met in Mr. Connors' store, December 10th.

Mr. McPike showed a collection of grapes in a fair state of preservation, kept by simply leaving them in the bags that had been put on to prevent rot, and laying on tables in the cellar. Had had better success than with any other method he had ever tried.

### ORCHARDS.

were reported in good condition, and if the weather proves favorable, there is every prospect of a good crop of fruit of all kinds next year.

### SMALL FRUITS.

were reported in good condition, except strawberries, of which the general opinion seemed to be that there would be about half of an average crop. Many patches are poor, but some few growers, who have cultivated well, reported their prospects as good or better than ever before.

On motion the President and Secretary were instructed to invite the State Horticultural Society to meet in Alton next year.

# PROCEEDINGS

OF THE

# ELMWOOD HORTICULTURAL SOCIETY,

## FOR THE YEAR 1887.

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REPORTED FOR PUBLICATION BY W. J. HUMPHREYS, SECRETARY.

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The Elmwood Horticultural Society was organized in Elmwood, Peoria County, Feb. 19, 1887.

OFFICERS:

*President* — D. H. Gray.
*Vice-President* — James Davidson.
*Treasurer* — E. R. Brown.
*Secretary* — Wm. J. Humphreys.
*Librarian* — G. J. Pringle.

## JULY MEETING.

### FRUIT AS A DIET.

BY J. J. LOBAUGH.

Life is a continual round of eating and drinking. We begin our earthly career very much as young birds, by opening our mouths and swallowing whatever goes therein, be it milk, catnip tea or, perchance, a shirt-button or slate-pencil which may happen to lie upon the floor; not omitting now and then to worry down a pin or a needle to the great alarm of our more experienced friends. We have at that time only the animal instinct to swallow, an instinct that is mighty with all animated creatures. The stomach, located in nearly the centre of the body, is an almost insatiable organ, and is not long satisfied to rest; but at least three times a day it raises its still small voice, which cannot be ignored nor misunderstood, and imperiously demands of the hands, however little they are inclined to exert themselves to provide more provender, and the stomach has a way of enforcing its demands that is peculiarly effective, for it stands between the

rest of the body and complete dissolution. "Deny me," it says, "and death cometh quickly." No matter how lazy a fellow may be, perhaps even a tramp on the highway, he has the same inexorable kind of a stomach that you and I have; a fact we are prone to forget when he calls in the morning at the kitchen door for a scant breakfast. We may not have much sympathy with the man, nor his mode of life, but let us not forget his suffering stomach.

Eating then, is one of the great activities of life, and promotes, through its necessities, nearly all the other activities of this busy world. If we could live without eating, or could even satisfy our hunger with inorganic matter, which so abounds in the world, this earth, it would seem at first view, might be a kind of paradise, especially for a lazy man. But the present arrangement has, doubtless, been wisely planned, whereby man is forced to action, and to almost unceasing effort to find, not only something to fill the stomach, but that something must be organic material. It must have lived before in the animal or vegetable world, its component parts having been arranged under the domination of a certain power or force, called vitality, or life.

We instinctively shrink from taking life; even decapitating the ancient hen that is to make a savory dinner, is a job not to be done without some compunction. A life put out by a stroke of your hand! momentous thought!

When you cut down a tree you arrest a wonderful tide of vital forces that have been in operation, perhaps for centures. I think even a tree should not be destroyed thoughtlessly. The blade of grass you trample under foot is endowed with a certain kind of life, but the animal consumes the grass; one animal consumes another; and man, perhaps, consumes the animals; or he digs from the earth the matured tuber, gathers in the field the ripened grain, or fills his basket with luscious fruit, and you say: "Here is something man may eat without destroying life." Not so, my friend; for the germ of a future growth is in the tuber, the grain or the berry, and the substance you consume as food is the material nature has stored up to feed the future plant till it gets able to take care of itself, and when you eat this substance you blot out an innumerable multitude of future plants. The coming chicken is in the egg, although your eye may not behold it; and yet, when you eat the egg you consume that same possible chicken, head and tail, claws, bones, feathers and all.

The human stomach, then, wants organized material and will be satisfied with nothing less, and we must interfere with life processes, in some form, in order to obtain this material. It must not be inferred that this organized material enters the blood and is deposited in the tissues unchanged. Such an idea would make us shudder. To think that a piece of hog-flesh I ate yesterday is still hog-flesh in my body would not be a pleasant thought. But if such were the

case, and as "birds of a feather flock together," all the pork might go to one part, all the chicken to another, and all the berries to another; therefore I might have the ears of a cow, a strawberry nose and the whiskers of a pig. But, fortunately, such is not the case, for the system has the marvelous power of transformation — of taking all the various substances the human family use as food and transforming them into human bone, muscle, blood, brains, etc. Hence we see a wonderful variety in the diet of the human family, and what a man may eat is not to be dictated to him by any physiologist, however learned. True, there is a general principle that cannot be ignored; for if the body is to be kept up to a healthy standard, the food supplied to it must not be destitute of those elementary principles which the system requires. But nature makes a liberal provision for all the different circumstances in which man may be placed — difference of latitudes, climates, soils, etc., so that there are few parts of the earth where man may not, by reasonable industry, get the means of supplying his bodily wants. But all do not eat the same kind of food, and "what is one man's meat may be another man's poison."

What are called the protein compounds are the most valuable, as they contain the most nutriment. They have in their composition the four elements — oxygen, hydrogen, carbon and nitrogen. Many articles of food contain little or no nitrogen, hence the protein compounds are termed the nitrogenous bodies. They are albumen, fibrin, casein, gluten and some others. They are sometimes called the albumenoids. They form a large part of the human body, do not crystallize, have a jelly-like form, and are coagulated by heat, except casein, which is the curds of milk, and is coagulated by an acid or by rennet.

Albumen is found most concentrated in eggs. It also exists largely in animal flesh, in grains and in milk. Gluten is found in wheat and other grains, and is sometimes called vegetable fibrin. The foregoing and a few others are called the flesh and muscle-forming foods, and it will be observed that excepting gluten, they are found abundantly in food of animal origin.

Then, there is another group of articles called the heat-producing foods, the hydro-carbons, such as oil, butter, sugar (starch is converted into sugar). These are derived, like the other groups, from both the animal and vegetable kingdoms. They make adipose tissue, give heat, and thereby warm the body; but as they contain no nitrogen, they cannot alone supply muscular tissue. There are various other things that help to make up the system, and many of an inorganic nature to form bone, teeth, hair, etc. But even these mineral substances enter the body with organic compounds. The two great groups I have named are considered, however, the chief necessities for nourishing the body. Animal flesh, eggs, milk, wheat-bread, cheese and butter, contain more nourishment, perhaps, than

most all others combined. A diet of these would certainly be substantial, and yet would not maintain health very long. The individual would become plethoric, and the liver overtasked by so much carbon, especially in hot weather.

A diet of sugar, starch, gum and oil might make one oleaginous and sleek, but weak and pusillanimous.

Or feed a man on both of the above groups and send him on a long sea voyage. Your man would probably never come back, for he would die of scurvy unless he could get some lemons or other acid fruits, which would soon restore his health.

A diet of lean meats and fruits, with no grease, would, perhaps, develope scrofula and consumption.

Bread has been called the staff of life, and "butter on it," it has been said, changes it into a gold-headed cane, and yet it has been wisely ordained that man shall not live by bread alone. I infer, then, that man requires a mixed diet, that something is needed beside the bare essentials and substantials; in short, that variety is here, also, the spice of life.

The meat eater of the far north needs sauce. Dr. Hall relates that at one time the natives killed a deer and had a feast in one of their ice houses. The whole deer was divided and eaten raw. He got a piece that was so very delicious that he went near the light to ascertain what he was eating. He found it was the frozen contents of the deer's paunch. Truly "when ignorance is bliss, 't is folly to be wise." This vegetable compound formed their sauce, and it was healthful and palatable, perhaps as much so as a dish of strawberries or cranberry sauce.

The fruit eaters of the torrid zone want meat. In Africa, amidst the greatest variety of native fruits, a traveler found a large worm, probably like one of those huge tobacco worms, as thick as your finger. He showed it to a native girl, and she clapped it into her mouth in a twinkling as a great delicacy. She, too, liked a mixed diet.

The natives of the South American plains are great beef eaters, though living under the Equator and among the finest fruits in the world.

Rice forms the chief diet of one-third of the human family, but the Chinese take rats and mice as a dessert. Another form of mixed diet.

Then, if it be true that man develops best on a mixed diet, it becomes a vital question what we shall eat and how we shall mix things. Experience has taught man how to do this, and the housewife who placed your dinner before you to-day knew just how to do it, though she may never have studied the science of it. Different nations have different appetites, and we may not all eat out of the same dish, yet we all manage to get some variety, the Asiatic or the Digger Indian in his way and we in our way. A pie made of

ants may be appetizing and very nice to the person brought up in that way, but we find the fruits more to our liking.

Fruits occupy a prominent place on all tables, and deservedly so, not wholly for the real nourishment in them, though they vary much in this respect; some large, pulpy fruits, when well ripened, contain sugar enough to make them moderately nourishing, some contain oil, and some have a little nitrogenous material in them, but the larger part of many fruits is water, most of them seventy-five to eighty-five per cent. water; but they contain some pleasant acids, that are cooling and healthful, and some solid material, but the latter in so small an amount that they would require to be eaten in very large quantities to nourish the body.

Fruits are grateful and healthful in the springtime to reduce the the blood that has become overcharged by the rich and heavy diet of the winter months. Here is their use, in my estimation, and to add relish to other food. Bread eaten with some kind of fruit often tastes better. To be used as a dessert, at the closing of a meal, thereby diluting the heavier foods with a light and pleasant article, more conduces to the health, especially in the summer season, and prevents billiousness. But he who would undertake severe labor, either with hands or the brain, could not succeed on a diet of apples and strawberries. Oranges and lemons make a grateful drink, but he who would eat only oranges would not grow strong or fat. In feeding the debilitated, whose vital powers may be low, we would not depend on fruits, but we would use milk, beef tea, toast bread, etc. Fruits may come in, sometimes, as a relish, but the vital powers would surely fail on a diet of dried-apple tea and oranges.

Fruits are sometimes used for their laxitive properties. Many of them contain a great number of fine seeds which act as so many foreign bodies, and have the desired effect, and sometimes these may not be well borne in some irritable conditions.

Some persons can scarcely eat fruit at all, as it seems to ferment, and thus to cause heartburn, headache, diarrhœa, etc. I know those who have to use fruit with much caution on this account, even an apple or a few grapes giving them a miserable day. Such persons can sometimes eat cooked fruits, as many kinds of fruits are made more digestible by cooking, but I never heard of anyone trying it on an orange.

In conclusion, I may say, I believe in eating. Let each one eat what he likes, if it agrees with him. There can be no cast-iron rule. Your natural instincts will generally guide you, and even when a patient asks me what he may eat, I ask him what he wants, and we generally come to a satisfactory agreement. In the convalescent there is wisdom in finding what the appetite craves, for there is generally less danger from the quality of the diet than from the quantity. When I was a young physician I was exceedingly particular; I am duly cautious yet, but not so over-particular, as I once was.

# PROCEEDINGS

OF THE

# Kankakee Valley Horticultural Society.

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## FOR THE YEAR 1887.

REPORTED BY H. C. BLOOM, SECRETARY.

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## FEBRUARY MEETING.

The Kankakee Valley Horticultural Society met at the Farmers' Club Room, in the Arcade, on Saturday, the 12th of February.

Meeting called to order at two o'clock p. m., by President Barnard.

Mr. Cunningham was asked as to condition of grape vines. He said he had nothing to report, as his vines were all on the ground and covered.

The Secretary said he had recently examined some of his vines that were left on the trellis, and found them all right in flower and bud.

The President was reminded that he had an address to make at this meeting. Yes, he said, according to the programme, he was to deliver an address, but he thought it was rather crowding the business, as he had a report to read (as per instructions of this society), of his observations at the State Society recently held at Jacksonville. He said, however, that if he had any one thing to recommend it would be what Prof. Budd so urgently recommended to horticulturists, viz., the cross-fertilization of our fruits, and he hoped that some of our younger members would take hold of the matter, and perhaps Kankakee might originate something of permanent value and worthy of general cultivation. The President now read his report, which was a very interesting paper, but as it failed to reach the hands of the Secretary, it cannot be given.

Mr. Cunningham made some inquiry about the grape rot, and described it as it manifested itself on his vines.

The President said Mr. Riehl and others stated that whenever the mercury falls below sixty degrees the rot is at once arrested. The cause of the rot is not so clearly known.

The Secretary said he had observed that the rot was very much worse in hot, moist weather, and where the vines were thick on the trellis. He thought a free circulation of air and sunshine was essential to the health of the grape.

Mr. Mortimer had noticed the same thing, and thought that clean cultivation and free circulation of air was — not a remedy — but a sort of a preventive. In answer to a query as to the keeping qualities of grapes, Mr. Mortimer said that no thin-skinned grape would keep very long; it took a thick-skinned grape to keep. Now there is another thing about which I wish to say a few words, and which I think of very great importance as mentioned by our President. I allude to the hybridization of our fruits, and especially the apple. Mr. Peter M. Gideon, of the Missouri Experimental Fruit Farm, and the largest apple tree grower in America, has accomplished wonderful results in that line in the last sixteen years, by natural hybridization, *i. e.*: by planting different varieties in close proximity, so that the natural flow of pollen will do its desired work. Mr. Gideon originated the Wealthy apple, and he says that since that apple first fruited he has raised more than twenty first-class apples — as good as the world can produce — in succession from the first of August to March, and in hardiness of tree surpassing all known varieties of the common large apple. Now if Mr. Gideon has accomplished so much in so short a time, by his method, what might be done by Prof. Budd's artificial cross fertilization. It seems almost like a new creation, when we can create new varieties at will, as we can take the pollen from the early flowering varieties, and preserve it for weeks, if necessary, and then use it to fertilize late flowering varieties. This being the case it opens up a wonderful field for the improvement of our apples.

The question was raised as to the hardiest varieties of the raspberry.

Mr. Mortimer said the Tyler, Ohio, Shaffer's Colossal and Cuthbert were hardy; the Gregg, with him, was only half-hardy.

Mr. Small said the Gregg, with him, is hardy, and an excellent berry.

Mr. Cunningham likes the Gregg, a splendid berry, and perfectly hardy. His soil is a dry, sandy loam.

The President said his experience was similar to Mr. Mortimer's, but his land was somewhat low and moist. On dry land it would probably prove entirely hardy.

At the suggestion of Len. Small, the subject for discussion at the next meeting will be "How to Plant," more especially, how to plant fruit trees.

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## OCTOBER MEETING.

The Kankakee Valley Horticultural Society held its regular bimonthly meeting in this city October 8. President Barnard in the chair.

The meeting was called to order at 2 p. m. Reading of the minutes of the last minutes dispensed with.

President Barnard read quite a lengthy communication from A. H. Gaston, of Lacon, in this State, on the subject of timber culture, in which the writer took very strong grounds in favor of planting and cultivating quite a number of varieties of timber trees for profit, and especially the Black Walnut and Catalpa Speciosa. The last named variety seems to be a great favorite with the writer on account of its rapid growth, great hardiness, its beautiful flowers, and the lasting nature of its timber, excelling the red cedar in that respect.

President Barnard said he did not agree with the gentleman in regard to the great profits to be derived from the growing of the Black Walnut, although he considered it a valuable timber tree, and worthy of extensive cultivation on land adapted to its growth.

Mr. Mortimer — The gentleman has not said a word about the American Basswood or Linden, which I consider a valuable tree for shade, on account of its rapid growth, dense foliage and its honey-producing flowers.

Mr. Cunningham thinks the Honey Locust a valuable tree, on account of its rapid growth, beautiful foliage and lasting quality of its timber.

Mr. Stroud thinks we could utilize the Black Walnut along the roadsides, for fastening fence wire to, and leave the nuts for the boys.

Mr. Dickinson told of a Black Walnut tree in Kansas that sold for $300. He thought it would do to plant for posterity.

Mr. Mortimer not having an essay to read, as was expected, was called on to give his experience in growing orchard trees. He said he did not claim any special knowledge in regard to apple tree growing; have planted quite a number of varieties in the last eight or ten years, and had only the Duchess and Wealthy left; thinks we do not cultivate the soil enough, should keep the surface soil fine and mellow in order to prevent evaporation. Roots cannot grow and flourish in hard, dry soil. Mr. Mortimer spoke at considerable length on the subject, and was listened to with attention.

President Barnard said, if we cannot cultivate we can mulch; had mulched a few of his trees very heavily last Spring, and they had made a growth of from nine inches to three feet, and it was from these trees that he got all the apples he raised this year, and at the present time the foliage on these trees is fresh and green, whilst the unmulched trees shed nearly all their leaves some time ago.

Mr. Mortimer said he was in favor of mulching, and related his experience in mulching raspberries, where it appeared to be of decided advantage. Thinks it would be difficult to mulch a large orchard.

The following questions were propounded by Mr. Stroud:

Question 1. Do you consider the fall a good time to plant apple trees?

Mr. Stroud said he had planted in the fall, and his trees all died.

President Barnard said his experience was against fall planting.

Mr. Small thought trees could be successfully planted in the fall if properly done, and the trees well earthed up.

Question 2. Can rose bushes be planted in the fall and do well?

The experience of those present was against fall planting. Mr. Small thought they might be planted in the fall, if well done, and the tops bent down and covered with earth to the depth of several inches.

The Secretary said that rose bushes received in the fall, or grape vines, should be heeled in, or completely buried in the earth, where water will not stand, and then planted out in the spring in well enriched soil, and well taken care of, and there will be no failure.

Question 3. Should raspberries be trimmed in the fall and be mulched, and with what material?

Mr. Mortimer—Some one says, cut out the old canes as soon as done fruiting; others say, leave them till spring; my own opinion is to cut out the old canes, and if the new canes were not pinched back during the growing season, all you can do now is to cut them back to the proper height.

Mr. Cunningham—Would leave the old canes till spring as a sort of winter protection to the young new canes. Would mulch with half-rotted manure, or leaves when they can be procured. The young shoots should be pinched back during the growing season, and you will have a stockier and better plant.

Question 4. When shall we mulch strawberries, what with, and how deep?

Mr. Barnard—Mulch with prairie hay, and quite deep, three or or four inches.

Mr. Cunningham—As to time, as soon as the plants have done growing in the fall.

Mr. Mortimer thinks that is the best time, and considers prairie hay the best mulch on account of its freedom from foul seeds.

Question 5. Can grape vines be planted in the fall with success?

Answer. Treat grape vines the same as roses.

Question 6. Peach stones; how must they be planted and when?

Answer. Plant in the fall, in a shallow vessel of some kind, with earth mixed in with them, and slightly buried in the earth, and leave till growing weather in the spring, and then take up and plant in seed bed, or plant where wanted to stand.

Question by Mr. Small — Is it possible for an orchard to succeed on a sand hill?

President Barnard gave the report of A. S. Vail, of Momence, who said he had seen a number of orchards in the eastern part of the county and over in Indiana, growing on ridges of almost pure sand. The trees looked healthy and had a good fair crop of fruit on them; they were mostly of the Willow Twig variety.

Mr. Kenaga said: We have plenty of almost worthless sand ridges in the eastern part of the county, and if they could be made available for successful orchard planting they would become valuable.

Quite an interesting discussion was had in regard to the growth of weeds, seeds, and spontaneous growth, which the Secretary cannot give for want of space.

President Barnard read a letter from A. C. Tuttle, of Baraboo, Wis., describing the apples he sent to our Society, fourteen varieties, all fine-looking apples; three or four of them were really first-class in quality and appearance, and we think all of them will prove really valuable for this section of the country. The Secretary regrets he cannot give the names of the fruit sent us, as he neglected to take the names from the letter sent to Mr. Barnard. Our Society is under obligation to Mr. Tuttle for his courtesy in sending so many specimens of the new Russian apples, and he has our hearty thanks for the same.

Mr. Cunningham inquired of members about the prospect of a strawberry crop another year.

Messrs. Cunningham, Small, Barnard and Mortimer, and the Secretary, thought the prospect was anything but favorable. The plants were in poor condition for much of a crop another season.

# PROCEEDINGS

OF THE

# WARSAW HORTICULTURAL SOCIETY

## FOR THE YEAR 1887,

REPORTED FOR PUBLICATION BY J. T. JOHNSON, SECRETARY.

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*Stated Meetings. Third Wednesday in Each Month.*

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## JANUARY MEETING.

Warsaw, Ill., Jan. 19, 1887.

Society convened in Horticultural Hall, at 1 o'clock, p. m., and was called to order by President C. N. Dennis, who entertained the Society with an interesting Annual Address replete with valuable suggestions drawn from another year in our history and experience.

### DISCUSSION.

T. F. Leeper — Again we report the peach buds killed, and our markets will have to be supplied from regions favored by a climate more mild than that of Central Illinois.

J. M. Berry — Our apple trees — those remaining healthy — are, as yet, favorable to a crop. The weather has been very severe, yet our fruit buds remain uninjured.

J. T. Johnson — It is not the degree of cold that destroys the fruit buds in the apple orchard. Indeed, they are seldom injured by the cold at all. Our spring weather is much more precarious for them, and the real injury ofttimes comes after blooming.

The election of officers for 1887 was taken up, with the following result:

*President*—Homer D. Brown, Hamilton.

*Vice-President*—C. N. Dennis, Hamilton.

*Treasurer*—C. C. Hoppe, Warsaw.

*Secretary*—James T. Johnson, Warsaw.

Committees on Program, for an effective year's work, were appointed; also Committees on Orchards, Gardens, Berries and Small Fruits, Floriculture, and General Agriculture, with instructions to observe and report monthly and annually.

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## FEBRUARY MEETING.

The Warsaw Horticultural Society met at City Hall, Hamilton, February 16th, at one o'clock p. m., President H. D. Brown in the chair, who opened the meeting with remarks, saying: Horticulture and floriculture are so closely allied that one could not well exist without the other. If it were not for the flowers we should have no fruits. The Warsaw Horticultural Society being cognizant of the fact that their own society, as well as all others (even our nation), cannot advance without the approval and help of the good women of our land, cordially welcome them here to-day.

### A TALK UPON ORCHARDS.

George O. Hilton, of Iowa—The rigors of our climate during the past year will surely be manifested both in the tree growth and fruit crop of the coming year. The drouth of last summer was one of the greatest severity.

Mr. Z. Hollingsworth, of Iowa—Our orchards and climate have behaved so very badly during the past few years that we are poorly prepared to report. We have, however, learned not to expect very much from our orchards, and really we shall be disappointed if we do get much from the wrecks left of our old plantations. Our past winter has not been as cold as some preceding winters, but cold does not always affect the same. I fear for the wretched condition of the old orchards.

Mr. F. Harlan, Canton, Mo.—With us the apple trees are not much injured during the present winter. Peach buds all killed.

Mr. E. S. Dennis — As a consequence of the drouth, late growth of wood is not fully matured; all early growth in the apple orchards looks favorable and promises fruit.

## FLORICULTURE.

Mrs. J. P. LaMonte — My plants are doing nicely, no trouble from frost. Have learned to not place them too near the glass. The bloom has not been profuse, but very perfect and pretty.

Mrs. H. D. Brown — The better the attention the better the plants and the more profuse the bloom. Care and experience are requisites to successful floriculture.

Mrs. A. L. Connable, of Montebello, and Mrs. Gill, of Carthage, each paid fitting tributes to the flower garden.

Mr. F. Harlan exhibited leaves taken from a sport of the coleus. They were of a delicate and very beautiful coloring.

## HORTICULTURE AS IT IS, AND AS IT MIGHT BE; OR, PRACTICAL AND ESTHETICAL.

BY C. N. DENNIS, HAMILTON.

Biblical history gives the occupation of the first man, Adam, as a horticulturist, and when he was driven from the garden, and a curse placed upon him and his seed, there is no record of any being placed upon the occupation; and, therefore, we may reasonably conclude that it is approved by God, and, if properly conducted, will be successful. By the sweat of his brow man was to earn his bread, and, I suppose, raise his apples.

I will speak more particularly of the apple, as its range of cultivation is more extended, and its use more diversified and general than any other fruit. It is king of fruits, and consequently remarks in regard to it will apply more or less directly to other fruits, and to general horticulture. Our society has been in existence over twenty years, and how much have we learned, how much has been proved beyond question.

It is said in our papers read before this and the State Society, that we must plant on high ground, on low ground, on dry ground, on moist ground; plant trees with high heads and with low heads; thin out the heads to let in the light, shorten in the heads to more easily gather the fruit, and to not trim at all. Plant deep so as to not dry out; and shallow, so the roots would be out of the water. Cultivate well, to get a good growth; cultivate but little, because it makes them tender. Mulch, to protect from heat and from cold and from drouth; and keep all trash away to protect from mice and

insects. Plant many kinds, so as to suit all tastes and markets; plant few kinds, because there are only a few kinds that pay. And these truths (for they are more or less truths) have been rung from every part of this state, yes, and every adjoining state, just as men's ideas were awakened by some one or more examples. And, having decided to plant an orchard, Mr. A. says plant deep, so he digs a deep hole, crowds his roots into the hole, fills in the dirt, wishes it well, and goes his way, having done his duty, and feeling assured that he is morally certain of good results. And so on through the list of theories. Well, after having planted the orchard, each after his own hobby, back they go to the books, or some where, and they read: "Cultivate for the first years in some hoed crop." All right. Again, what does that mean? corn or potatoes? Well, generally corn, and so it is planted as taught, and thoroughly cultivated, and the tree generally pretty thoroughly barked by the singletree by the time the orchard is four years old. Then it is sowed to grass, and mowed in the last of June, and the hay carefully raked and removed, leaving the ground exposed to the burning sun, and if a seasonable shower allows the grass to start, it is pastured to consume the fallen fruit, and to save the grass, and this is repeated until finally the tree, feeling the undue strain put upon it, begins to decay, and, as everywhere else in nature, puts forth its best efforts to perpetuate its species, produces an over crop of fruit, is enfeebled thereby, encounters a severe winter and is killed. Strange if it was not.

Now, I am aware that this is not the picture that every man would see if looking in a glass that reflected his orcharding, but I fear the number is few (myself in the same boat) who have not ridden some of these hobbies. I hardly think this can be called an overdrawn picture, although there are many noble exceptions. Time will not allow me further to show horticulture as it is taught by the records (for the records do teach), and as practised by individuals who find some of these theories in the book, and adopt them without fully understanding the surrounding circumstances.

Now as to horticulture as it might be. If our little horticultural society twenty years ago had adopted a ledger account with each of the several items that have been mentioned, giving all of the surrounding circumstances, and balanced the account every five years, they could have positively asserted that such and such things were facts, for here is the proof, and the planter could turn to the record and see how the most successful one or ones (for one swallow does not make a summer), managed on similar soil, having similar surroundings, viz: exposure, drainage, inclination, etc., etc., to that on which he wished to plant; and then, having followed the well-proven plan, would be justified in expecting similar results.

And now I will make the assertion, that there have been more trees killed in Hancock county by careless handling and improper planting and care, than have lived. And secondly, that of those

that did live to produce fruit, more have been killed by abuse, neglect, mice, insects, sod and starvation, than by cold.

Practically, what, where and when shall we plant, and how much? First, what? This depends upon the object sought. To illustrate: If planting a commercial orchard, I know of nothing better for Hancock county than Ben Davis. But not for a family orchard. Be governed by your taste and desire, using good, sound sense therewith, and not run to extremes. Don't plant oranges or bananas, expecting good results, or plant a sour apple if you prefer a sweet one. When? Now, or as soon as you can get the ground ready; but not before, if you wish success. And this brings in the "where to plant." And here I suggest planting where you want your orchard, and to get ready. If the ground is wet, or liable to standing water, see that it is properly drained, both surface and underdrained — by tile, if necessary. Subsoil, if ground is heavy, and properly enrich. Then plant in rows, so as to cultivate by horse power. Properly protect the trees so as not to bark, and be comparatively honest with your orchard, by returning say at least one-tenth of the income of the place in fertilizers. How much? depends upon size of farm and the family. I doubt if the seven heads and ten horns means that a man who has but seven acres should plant enough for ten acres thereon, thereby crowding all to death.

But on all farms, and in all but compactly built towns, some fruit can and should be raised. A grape-vine loves to climb beside the end of a house or outbuilding, and will repay all care bestowed upon it; and if the yard or lot is too small to admit of the cultivation of fruit, a few shrubs and flowers may be grown in pots or open ground. Here is a field limited only by the means and leisure of the owner, and the value of the same can only be measured by the love the owner has for them. I know of a mansion, situated upon one of the principal avenues of a western city, where a $9,000 greenhouse occupies three sides of the square, filled with the rare and beautiful, fountains play within it and upon the lawn, and $50,000 per year is appropriated for the maintenance of the establishment. And yet that home is a hell. The husband does not visit it sometimes for six months at a time. The wife, when there, is the devotee of fashion, moving in a circle secured by wealth; the only child a drunkard. I know of another home, less pretentious, the head of which has said to me: "I hardly know one flower from another, and don't care anything about them;" and everything about the place has to me a stiff, harsh look. Why the groves were God's first temples, and any one who can truly say I do not care for flowers, seems to me can care but little for God or his handiwork. If the flowers have no refining qualities they are comparatively valueless. The simple white rosebud pinned at the throat of modesty, though clothed in simple garb, has more real value than the most costly bouquet fastened upon the low corsage of fashion's devotee. The tiny

bouquet sent to the sick during life is more beautiful and of greater worth than the mass of flowers heaped upon the casket, prepared by a professional for the mercenary dollar, and paid for only to be mentioned in the society paper that writes up the funeral. Selfish, indeed, must be the man or woman who is unwilling to divide the pleasure, the enjoyment of both fruit and flower with others. Simplicity is revealed by both leaf and blossom, and among those native and to the manor born may be found some of the hardiest and the best.

I will admit that it is very esthetical to talk or sing of wandering through labyrinthian walks, beneath towering magnolias, and fanned by the breath of the orange blossoms. But the change is most too sudden for delicate nerves to step out from an imaginary world into a temperature 25 degrees below zero, and be fanned by a Sucker breeze moving across the prairie at a rate of 40 miles per hour. Or to write about babbling brooks, fed by living springs, and leaping down precipices and loitering in pools of imaginary depth, in which the speckled trout play hide and seek, when there is not a mountain in the state or hardly a stream in which the water is pure enough for a trout to live in. Illinois is a great, a noble, a magnificent state, but not practically adapted to raising oranges or tropical plants in open ground.

I have written this to provoke criticism and discussion, hoping that from some such discussion may arise more systematic effort. Now that the general government has appropriated a large sum for the establishment of experimental stations in every state, it seems to me to be of the utmost importance that local societies should do more careful, systematic work, and keep a record of the same; 1,200 different kinds of apples are said to have been planted on the University grounds at Champaign, but what does the state know of them, or their success, or value. If the governmental experiment is no better, I say away with them, we can do better ourselves if we will but try unitedly and systematically.

Song by J. A. Hudson, also by choir of Congregational Church, "Beautiful Songs of Spring."

Essay by Mrs. A. W. Robinson, "Thorns and Roses."

Miss Stella Gregg introduced the Misses Hollingsworth, of Iowa, as "our visitors," and suggested further discussion on winter-blooming plants.

Miss Hollingsworth — From what plants do you get the most winter bloom?

Mrs. Connable — Geraniums and begonias.

Mrs. Lyon — In real beauty, pleasure and gratification, the foliage plants are as much admired — and deservedly so — as any of our winter-blooming plants.

Mr. Harlan — The hyacinth is very pretty, and for winter beauty I grow also the fern.

Question — How shall we destroy the vermin that infest plants?

Miss Hollingsworth — Some use sulphur, but it is attended by bad results. Take stems of tobacco, burn in your greenhouses, closing to keep in the fumes. This will destroy all insects, except scaly bugs ; for these use soap suds.

Shall we continue to plant orchards? was asked by our venerable member, Mr. J. C. Berry. For six or seven years orcharding has been disastrous. Does any one know of any orchard that is thrifty and profitable?

President Brown instanced the orchard of Mr. T. F. Leeper as both thrifty and profitable.

Mr. J. T. Johnson — Shall we succumb to unfriendly weather or flee from the ravages of voracious insects? Never! We shall continue to grow orchards, and for one I shall plant at least five hundred trees this year, trusting that in "due time we shall reap if we faint not."

Dr. Lyon — Tile may be used for irrigation or holding surplus water in reserve for times of drouth, as well as for purposes of drainage. It is done by sinking ten-inch tile two feet on an exact level so as not to flow. Result : They are kept full of water to evaporate in time of need.

Mr. Hall — Rabbits and mice have done little or no injury this year.

Mr. C. C. Hoppe — The agents who sell Russian apricots are abroad. They ask a round price, and are very anxious to sell in large lots, especially to the beginner. They avoid the experienced horticulturist, who knows better than to invest in Russian apricots.

Suggestions as to tree planting are invited for March meeting.

## MARCH MEETING.

The Warsaw Horticultural Society met in the Society's hall, Warsaw, Wednesday, March 16th. President Brown in the chair.

A. C. Hammond read a carefully prepared paper on "Orchard Planting and Management," which was overflowing with intelligent thought and valuable experiences. The writer is evidently familiar with this subject and qualified to give us useful information upon a question of present importance to every fruit grower in the land.

### ORCHARD PLANTING AND MANAGEMENT.

BY A. C. HAMMOND, WARSAW.

That the outlook is discouraging, particularly to the apple grower, is only too evident. With half of his trees dead, and the price of his products ruinously low, the orchardist is more than half inclined to abandon his business and turn his attention to something more profitable.

We often hear the remark made that our winters are getting colder, and our summers drier, and insects increasing so rapidly that fruit cannot longer be grown with profit, and that our future supply must come from a warmer climate. The failures and disasters of the last few years would seem to indicate that this opinion is correct, and that the days of profitable fruit growing in the northwest are numbered. But before accepting this theory, let us see if we cannot discover some cause for this unprecedented destruction of trees.

Previous to 1880 our orchards were in excellent condition, but that season we gathered the largest crop they ever produced, nearly all varieties being loaded to their utmost capacity. It will be remembered that August and September and part of October of that year were very hot and dry, which made it impossible for the trees to ripen their immense load without drawing so heavily upon their vitality as to greatly weaken them. In 1881 the foliage appeared unhealthy, and the trees made but little growth, but bore a partial crop of fruit which the tree was in poor condition to perfect, and this was a further drain upon its vital forces. Soon after, our series of cold winters set in, and our orchards having been overcropped and underfed and scorched by unusual drouths, succumbed to the fury of the terrible blizzards. In my opinion, if the weather had been favorable, and the ground supplied with the ordinary amount of moisture, the trees would have been able to ripen the immense crop of 1880 without any special injury; or if during the next summer

the orchards had been cultivated and fertilized, or thoroughly mulched, the trees would have so far recovered that they would have been able to safely pass the ordeal of the succeeding cold winters.

But the damage is done, and the question is: how can it be repaired? A very large proportion of our orchards over ten or twelve years of age are more or less injured, and should be renewed as soon as possible. Where it is practicable, the best way is to plant on a new piece of land, and as soon as the new orchard comes into bearing, cut the old one down. But where, as often happens, it is desirable to keep the orchard on the same site, cut off half of it, and if the ground has been kept in good condition, replant at once; but if the soil has been impoverished by constant cropping, as well as by the drain made upon it by the trees, it should be thoroughly manured, or if this is out of the question, it will be better to wait a year, and sow to oats or buckwheat, and plow it under in June, then sow to rye in July or August, and turn it under next spring. When the first planting comes into bearing, the remaining half may be treated the same way.

Here the question we have been struggling with for twenty years again arises: What shall we plant? And at the risk of being severely critised, I will say, for a market orchard, ninety per cent. Ben Davis, and ten per cent. Willow Twig. Not that these varieties are entirely satisfactory in either tree or fruit, but taking all the circumstances into consideration, it is the best we can do. We may plant Jonathan, Minkler, Grimes' Golden, or Red Canada, and in the early part of the season the crop will appear very promising, but when we come to gather in October we find that we have nothing for market but Ben Davis and Willow Twig. The mortality of these trees has been great, but the conditions—over bearing, extreme drouth and cold winters — that caused this loss may not occur again for a generation; and if we profit by the experience of the last few years, and give our orchards careful attention after seasons of overbearing and extreme drouth, we shall never see a repetition of this calamity.

Commercial fruit growing is not now being engaged in to any great extent, and the planting done is principally for home use; and for an orchard of this kind a different selection is, of course, necessary. Every farmer should plant at least one hundred trees, of which fifteen should be summer, ten fall, and seventy-five winter varieties. For summer I would plant two each of the delicious little Early Joe, Summer Rose, and Benoni, the same number of Sops of Wine and Golden Sweet, and five Red Astrachan. I would divide the ten fall trees equally between Maiden's Blush, Wealthy, Porter, Mother and Bailey's Sweet. For winter I would plant four each of Jonathan, Minkler, Grimes Golden, Red Canada, Wythe, Yellow Bellflower, Roman Stem (on strong soil), and Paradise Winter

Sweet, ten Willow Twig, and thirty-three Ben Davis. There are many other varieties excellent in quality that might be planted if the planter is willing to increase the number of his trees, but those named will give a succession of the best fruit. In productive years there will always be a surplus, and by planting this large number of Ben Davis, it will be of a marketable quality.

There is no secret in the preparation of the ground. Plow and harrow carefully as for a crop of corn, and plant two rods apart, with an inclination to the southwest of twenty degrees, and in five years the tree will stand very near perpendicular, and be free from sun scald and flat-headed borers. The old plan of planting on a ridge is wrong, as it causes the water to run off rapidly which should remain and penetrate the soil. Where drainage is needed, it can be secured in a less objectionable way.

If I was asked to name the two principal causes of orchard destruction and deterioration, I should say drouth and starvation. Thirty years ago our soil was fresh and rich, and drainage very imperfect, and trees grew rapidly and bore annual crops of choice fruit, and in my opinion the loss of trees and shrinkage in quantity and deterioration of quality of fruit is not entirely, or even principally, due to severe cold. During the winters of 1855–'56 and 1856–'57 the mercury sank as low as it did during our late severe winters. These first mentioned cold winters did not injure our trees in the least, while the latter ones swept them half out of existence. In a paper read before this society a year ago, I referred to the changes that had occurred in our soil and surroundings since the planting of our first orchards, and expressed the opinion that to these changed conditions are due the failures of late years, and careful observation another season has convinced me that the theory then advanced is correct.

At that time most of the prairie was covered with grass, and lakes and ponds, in which water stood nearly all the time, were very common; and even the rolling timber land, being covered with trees, brush, leaves and fallen timber, held the water for days and weeks that now passes off in an hour. The atmosphere, therefore, as well as the soil, was much of the time saturated with moisture, which, in connection with the fresh, virgin soil, enabled trees to properly ripen their wood and go into winter in such a condition that they could endure the same amount of cold that has now proved fatal.

But, says one, "What are you going to do about it? Would you turn back the wheels of progress a third of a century? Would you stop the thousands of miles of drains that have converted these swamps and ponds into fruitful fields, and make them again the home of the water fowl and moccasin, that these conditions of moisture may be restored?" Nay, verily; but scientific investigation and intelligent observation have taught us how to overcome

these changed conditions, and to so cultivate, fertilize and mulch that a sufficient amount of moisture to meet the requirements of the tree will be drawn up from below by capillary attraction.

Now is the favorable time to plant orchards. More than half of the trees in the northwest are dead, "with more to follow," and a general feeling of discouragement pervades; but the man who now plants an orchard, and gives it proper attention, will, in a few years, find it is a paying investment.

Mr. G. O. Hilton — We can safely adopt every sentence of this pertinent essay as our own sentiments.

W. W. Chittenden — If I have but one kind of apple I can sell. If I offer a huge collection, it confuses the buyer. Too many varieties are not profitable.

Pres. Brown — Is Rome Beauty hardy?

Mr. Hilton — Yes; I consider it so. They are very large in size, pretty in appearance, good in quality, keep well, and are popular with my customers.

Messrs. Hammond and Rockwell contended they were local in character.

J. T. Johnson — They do well on rich sandy soils. On rich prairie land they do not succeed well.

C. N. Dennis — Rome Beauty is doubtless a hardy tree.

A member — Would you cut a limb an inch in diameter at this time (March) of year?

Mr. Hammond — No; nor would I cut so large a limb at any season if I could avoid doing so. If it must be cut, then wax or paint the wound.

Mr. Hilton — As to condition of orchards: They have gone through the winter very well, but the past summer was too dry, and it may not result favorably. Time only will tell.

Mr. Rockwell — Can we depend on Paris green to kill codling moth?

Mr. Hammond — Yes; I shall experiment largely with it the present year.

Mr. Johnson — Made a note the evening of March 1st, about eight o'clock, of an immense swarm of very large moths. They

were discovered in the tops of apple trees, and even among the maples. Could not capture any, hence cannot tell what they were. They were almost as large as cowflies.

SMALL FRUITS.

C. B. Rockwell — My black raspberries were injured last August by drouth, and those that I headed back have done badly. I shall not head back this year.

Mr. Hilton — Heading back will do no injury if done at the proper time. It must not be too late, and all surplus sprouts should be kept down (during growing season) by the prompt use of the hoe.

W. W. Chittenden — I raise raspberries with good success — grow them to full size, and never head back during the growing season I top and tie up in spring only. I expect a good crop of them.

C. N. Dennis — I practice pinching at two and a half to three feet; this causes a growth of laterals, and these I do not trim or cut back until spring. I do not usually stake them at all. Mr. R. and Mr. C. probably get good crops and good berries by their plans. My plan is the lazy man's. I pinch in and save the stakes and trellises.

A member — Does any one know of the "Stone's Hardy blackberry?"

Mr. Dennis — Mr. Stickney says: "Let it alone."

VEGETABLE GARDENING.

President Brown — I planted a garden March 3d. On the 4th it was up; the chickens raised it.

C. C. Hoppe — My hot-bed plants are all up (March 16th.) For early gardens I sprout all my seeds before planting.

L. S. Dennis —Are they not tedious to separate for drilling?

Mr. Hoppe — We dry them sometimes with dust to prevent sticking.

L. S. Dennis — My lettuce, radishes, beets, onions, potatoes, etc., etc., are planted (they are all hardy).

Mr. Rockwell — Plant early potatoes deep. If cold, it prevents freezing. If dry, they will get moisture. I like long manure or straw for early potatoes.

J. T. Johnson — Is it a gain as to time of maturing to plant the potato very early, provided it lays for several days longer before sprouting?

L. S. Dennis — Possibly it is; as a neighbor who is always early, is seemingly as much in advance at ripening as he is at planting, although later planting seems to grow more rapidly.

W. W. Chittenden — Have recently read an article on using whole potatoes of medium size for planting. What say you all?

Mr. Hilton — The condition of your land, the kind of season, and the manner of cultivation have more to do with the crop than does the condition of seed. I have never done better than when I planted single eyes.

CLOVER.

C. N. Dennis — The question is asked, "Is clover a biennial plant." If so, when and under what circumstances will it appear differently? Instance a 200-acre pasture (of Col. B. F. Marsh's) that has been pastured the past two years too close to seed, and now the young clover is showing very plentifully. How is this?

A. C. Hammond — Once a crop of clover seed is in the land, it may lie dormant several years awaiting a favorable opportunity to come up.

Mr. Hilton — By lateral branches clover makes seed when we are not aware of it.

Mr. Chittenden — If you wish to grow feed your stock will eat up clean, without waste, double seed your clover and timothy. It will cost for seed, but your hay will not be coarse stalks, to be refused by your stock, your crop will yield largely of palatable and nutritious food, to be eaten up clean.

The time to harvest the hay crop is when a very few of the heads are ripened.

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## MAY MEETING.

### ORCHARDS.

In response to a call for committee reports, Mr. Leeper said : The outlook is not very encouraging. My old orchards that bore last year did not bloom this spring, but a young orchard has set well. I

expect to have about a fourth of a crop. Trees are healthy and are making a wonderful growth.

Mr. Hammond — The situation in my orchard has been described by Mr. Leeper. Trees over ten or twelve years of age that fruited last year have no fruit, but young trees are quite full. Insects are unusually numerous, and I fear that they will reduce the fruit crop to a very small per cent. of an average. The curculio has already left its mark on numerous specimens, and the leaf roller is feeding upon the young fruit. I am making arrangements to spray my orchard with a poisonous solution for the purpose of destroying these pests, as well as the codling moth, which is just beginning its work.

Mr. Rockwell — Nearly all the trees that have died in my orchard have been killed by borers. I think an examination will show that many of the trees supposed to be winter killed have been girdled by borers. They seem to do most of their work in trees growing on thin soil.

Mr. Berry — At the last meeting of the Central Illinois Horticultural Society, Dr. Humphrey said that the disturbance of the planetary system had been disastrous to animal and vegetable life, and, by causing unusual meterological phenomena, had injuriously affected the fruit interests. We are now about out of perihelion, and if it is true that our late disasters are in any sense due to planetary influences, we may take courage and rest assured that similar causes will not occur again for hundreds of years. I have of late been investigating this subject, and think with Dr. Humphrey that as we have had the storms and tempests of adversity in our fruit interest we may now look for a series of favorable seasons, when the orchardist will reap a golden harvest.

## BERRIES.

Mr. Rockwell — Strawberries are looking well and are now beginning to ripen. I do not think they will be as abundant as last year. Raspberry canes in the old plantations were injured by the sun last August, but the yield promises to be fair. Snyder blackberries are blooming very full. The best way to manage raspberry and blackberry plantations is to renew them every five or six years.

Mr. Dennis — I think the injury the canes suffered last summer will reduce the crop of raspberries. The only way to keep a plant-

ation vigorous is to replant or dig out the old stools. Strawberry beds need renewing often. J. F. Smith, of Wisconsin, one of the best growers in the west, never gathers more than one crop from his plantations.

Mr. Chittenden — New beds give the largest and best berries. I once sold $72.00 worth from about one-ninth of an acre, but it won't pay to grow strawberries at present prices by this method.

Mr. Dennis — By taking Mr. Chittenden's own figures we can prove that it will pay, as an acre would have amounted to over $600.00.

Mr. W. H. LaMonte read a short paper, in which he referred to the benefit our organization had been to the farmers of Hancock County, and said that it numbered among its numbers some of the best nurserymen, fruit-growers and farmers in the community.

Mrs. H. D. Brown now read a paper on "What Has the Warsaw Horticultural Society Done?" Her conclusions were that it had helped the fruit-grower to know what to plant. It had helped the nurseryman, by giving him a knowledge of varieties his customers wanted, and had wonderfully stimulated orchard and small fruit planting among the farmers. It had also created a taste for ornamental planting and floriculture, and made our homes brighter and more attractive for our children.

The next meeting — the annual picnic — will probably be held at Wild Cat Springs the last Wednesday in July.

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## JULY MEETING.

The annual picnic was held at Wild Cat Springs July 27. Hundreds of happy and intelligent faces greeted the call to order at 9 a. m., when Rev. Mary A. Safford invoked the divine blessing in the most fitting and beautiful language. The singing by the Hamilton Glee Club was most excellent, and added largely to the general interest of the occasion.

Committees report the following:

Upon Floriculture Mrs. B. F. Peterson, from Carthage Floral Guild, made an able and valuable report upon the condition and management of plants.

Upon Entomology Mr. C. W. Ames reports a threatening of chintz bugs in some localities, but possibly too late to do serious damage.

Mr. A. C. Hammond — I have checked the ravages of curculio on a portion of my orchard by spraying with London Purple, thereby saving some fruit.

On Vegetables C. B. Rockwell reported: The yield of early potatoes has been 25 to 40 bushels per acre. Owing to cut-worms it was difficult to get a stand of early cabbages, what did grow are very fair. Late cabbages are a failure. The excessive drouth and hot winds have been too much for the tomato. Much of the bloom was blasted, and much of the fruit has been sunburned. Lima beans are much injured from the same causes. In fact the drouth and heat have been too great for our vegetable gardens.

On Orchards Mr. T. F. Leeper said he had nothing favorable to report. For 1887 our fruit crop is a failure, and our barren wrecks of orchards give little evidence of past greatness. Our dead and dying trees are a sight that is truly discouraging. I shall not prune as heretofore, and shall be very careful in the future as to location of orchard sites.

Question — Do you favor a wet location? Answer: I do not.

Mr. Sherwood — I attribute the loss of trees, primarily, to sun scalds.

Mr. A. C. Hammond — Our trees die from overbearing and for want of fertilizing. Heretofore we raised abundant crops.

Mr. C. W. Ames — I disagree as to the cause of the loss of trees. We have been losing trees annually for a number of years, ever since the winter of the deep snow that fell when we had no frost in the ground. This was, I think, the beginning of the end. Our peach trees have not died from over-cropping, as we have not grown the fruit for a number of years.

Mr. R. W. McMahan — Our severe winters are the destruction of our orchards, and severe winters have been the rule for a number

of years. Possibly this may be obviated by a system of judicious mulching. The last orchard I planted I got two crops for my pains.

On Berries Mr. C. B. Rockwell reported: Out of 4,000 strawberry plants, set in the best of land and receiving the closest attention, I have saved only about 50 per cent. this year. Raspberries: Not a full crop this year, but have a good growth of canes for next year. Blackberries: A signal failure as to fruit. Grapes have made a healthy growth, and promise an abundant crop.

Mr. C. N. Dennis — My plantation never looked better.

Mr. C. C. Hoppe — For regular and abundant crops, especially of the blackberry, we must mulch.

Dr. Lyon — Cultivation is better than mulching; plow deep all season up to ripening. Plant six to eight feet in the rows, in order to leave room for the plowman.

Mr. Holt — I find my raspberry vines make a good mulch for my raspberry plants, but thorough cultivation of soil is highly essential to the successful growth of the berry plantation. Next year I shall test very early cultivation, to be followed by a careful mulching, using whatever I can get for this purpose.

A grand basket dinner was spread at 12 noon, followed by a social of an hour and a half.

The afternoon exercises were composed of singing and addresses. "Life and Its Adornments," by Rev. J. A. Souders; "Human Culture," by Dr. W. H. Githens; "The Letter Carrier" (a recitation), by Miss Myrta M. Robinson, of Wythe; "Incentives to Mental Culture," by Mrs. M. J. Fulmer, of the Montebello Floral Society. These papers, one and all, were of the highest type of excellence, and were delivered with splendid effect to an attentive and appreciative audience.

The audience joined in singing "Sweet Bye-and-Bye," after which an adjournment was reached, and the multitude attended the grand reception of the Ladies' Floral Society in the grove near the stand, and ice-cold lemonade and delicious ice-cream disappeared with a rapidity and a relish that was truly wonderful, and the annual picnic was voted to be a signal success.

## INCENTIVES TO MENTAL CULTURE.

BY MRS. M. J. FULMER, HAMILTON.

Parker, in his "Aids to English Composition," says: "An essay literally means nothing more than a trial, or an attempt, and suits alike the writer, who has no talent or inclination to pursue his inquiries farther, and the reader who is amused with variety and superficiality." Inspired by this highly flattering definition of the term — with only a few day's grace at our command — we venture a few impromptu thoughts.

The school of life is the most stupendous institution in all the world; and we that are assembled in nature's garden of beauty to-day are students, representing every degree of progress and diversity of talent, and all invested with the grand God-given right and privilege to acquire knowledge. An academic or classical course of study, in this age of the world, is within the reach of all who have the ambition and perseverance to work for it. This was not the case one hundred years ago. The old pioneers of our country, as a rule, had very meagre advantages, but none of them were mis-improved. They knew the almanac by heart; they were more familiar with the old fashioned bible that lay on the stand than are many of our graduates today. Their struggles, their sacrifices, their rude, yet in many instances gigantic achievements have a sacred place in the casket of memory, as well as upon the page of history. But in this era of education and advancement there is but little excuse for ignorance and illiteracy. And in a few more decades the uncultured man or woman, having no excuse to offer, will sink so low in the social scale as to be unworthy of recognition.

At the outset of these disjointed ideas let us bear in mind the truth that the splendid superstructure of a truly cultured mind and heart cannot be reared upon a crumbling foundation. We should then dig deep and lay the ground-work well. Not only should the mental and physical endowments of our nature be appropriately cultivated, but the moral and spiritual as well. It is a sombre truism of nature, that "if the spring yield no blossoms in summer there will be no beauty, and in autumn no fruit." This maxim pre-supposes the idea that youth is the time to break up the fallow ground of the heart, carefully select and sow the perfect germ. By no other process have we any reason to hope for a glorious and abundant harvest. This culture of the mind, or character building, in its inceptive stages seems to have fallen upon the frail shoulders of the mothers of our land. If the child develops into a grand and glorious man or womanhood, the fathers, bless their dear souls, are usually willing to bear the blame. If the reverse proves true, and the child becomes a moral wreck, who but the patient, loving mother, is re-criminated without "stint or measure." And while she may feel that reproach

in some degree is just, who one-half so keenly as she suffers the anguish of the bitter reflection, as she mentally exclaims, "Roll back thou tide of years, and let me find my innocent babe in the cradle once more, that I may commence anew, by the help of One mightier than I, the formation of that character upon whose fair brow must be indelibly written failure or success!" What a fearful responsibility rests upon the mother! Shall we not then, with renewed energy, devote ourselves more exclusively to the work of instilling in the minds of our children lofty views of life and destiny? Be constantly ringing in their ears Longfellows's grand psalm:

"Life is real, life is earnest.
And the grave is not our goal;
Dust thou art, to dust returnest,
Was not spoken of the soul."

When this initiatory work has been faithfully performed, where precept has been enforced by example, a successful life is the reasonable outcome. There are those in the world possessing many elements of mental superiority in whose minds the rank weeds of neglect have been allowed to grow unchecked. We find them sitting idly about, dreaming and talking of what wonderful things they might accomplish had they only been blessed with the genius of this one, or that one, not seeming to know that genius unassociated with labor wins no exceeding great reward, while labor is sometimes mistaken for genius. Alexander Hamilton once said: "Men give me some credit for genius. All the genius I have lies in this: When I have a subject in hand, I study it profoundly; day and night it is before me; my mind is pervaded with it. Then the effort which I make the people are pleased to to call genius: it is the fruit of labor and thought." There is much of truth in this. There are grand possibilities within our reach, which can never be attained without labor. Labor, united with genius, gave the world the soul-inspiring strains of Milton, of Cooper, Bryant, Wadsworth and Longfellow; through the tears of sensibility we have felt their power. Labor united with genius lifted up to the gaze of admiring Italy the bold master strokes of a Michael Angelo, a Guido, who coveted the wings of an angel that he might soar away to the paradise of God, and thereby be the better inspired to form an arch-angel which might cause the dull canvas to grow and expand into real life and glory! Labor, hand in hand with genius, produced the celebrated picture of the "Transfiguration," at which Raphael, in whom was combined sculptor, painting, and the gift of song, is said to have worked the night before his death. Labor and genius have thrilled the world with the grand symphonies of a Beethoven, Wagner, Mozart, Handel, Mendelssohn. The Swedish nightingale was lifted up from the ashes of obscurity, and the culture of her wonderful gifts brought the song-loving world to her feet. Labor and genius, to be successful, must go hand in hand, while wealth and genius are seldom found in companionship.

The Scotch peasant, who sung in the world's ear songs that will live forever, was hardly able to get a coat for his back. Yet, the pen of Burns, dipped in the "wine of the Gods," has thrilled the hearts of millions. Goldsmith was in want. Chatterton was driven to despair. Otway died of starvation. Yet it is not likely that either of these characters would have erased from his writings a single sentiment of sublime truth for the privilege of exchanging circumstances with the autocrats who neglected them.

While we cannot hope to rival these models of antiquity in classic lore, their common origin, their struggles, their perseverance, and at last the ripe, rich fruits of their labors are powerful incentives to mental activity. Let us also remember that we have the vantage ground of our ancestors in many respects. We are enriched with gifts and privileges to which they were strangers. We have the concentrated experience of many generations, the peaceful shelter of a free and prosperous government. Everything seems to urge us on in the pilgrimage of mind.

Public favor is often a wonderful incentive to mental exertion, inspiring a spirit of emulation by which beneficial results are secured. But it should be counted an ambition far more laudable to thirst for knowledge even "as the hart pants for the water brooks," not only as a means of securing an honored name among men, and that our own lives, our homes, and our loved ones may be made better and happier thereby, but because we are responsible to God for the talents he has given us. This should be our highest incentive to mental, moral, and spiritual advancement; while the consciousness that we may thoroughly enjoy the fruits of our labor, even as we journey down the stream of time, should inspire us with new zeal for every endeavor.

The woman who can close the door of her library and wander among the antiquities of the past, or the more modern achievements of the present, whose sweet song of the heart is tuned to the poet's lyre, who can wander about in the fields of nature, and find "books in the running brooks, sermons in stones, and good in everything," can never be the victim of ennui or discontent. She has a never-failing source of pleasure that palls not upon the taste; a fountain of happiness whose springs can never be dried up while reason lasts.

In contemplating a scene of natural beauty like this upon which we feast our eyes to-day, her soul is drawn by strong, yet invisible cords "from nature up to nature's God." By the eye of faith she is transported to a scene of supernal grandeur "beyond the tide." There are fields of perennial beauty, rocks and hills and streams and valleys, but faintly pictured here; flowers of fadeless bloom; music, of which she will never grow weary. The poet was filled with longings for this "home of the soul" when he sang:

"There's a land far away 'mid the stars, we are told,
Where they know not the sorrows of time:
Where pure waters wander thro' valleys of gold.
And life is a treasure sublime.
'Tis the land of our God, 'tis the home of the soul,
Where ages of splendor eternally roll;
Where the way weary traveller reaches his goal
On the ever green mountains of life.

Our gaze cannot soar to that beautiful land,
But our visions have told of its bliss:
And our souls by the gale from its gardens are fanned
When we faint in the deserts of this.
And we sometimes have longed for its holy repose,
When our spirits were torn with temptations and woes;
And we've drank from the tide of the river that flows
From the ever green mountains of life.

Oh! the stars never tread the blue heavens at night
But we think where the ransomed have trod.
And the day never shines from his palace of light
But we feel the bright smile of our God.
We are traveling homeward, through changes and gloom,
To a kingdom where pleasures unchangingly bloom;
And our guide is the glory that shines thro' the tomb,
From the ever green mountains of life!"

Wonderful school of life! Glorious book of nature! Thy mission is done when thou leadest us to adore the Infinite.

## HUMAN CULTURE.

BY DR. WM. H. GITHENS, HAMILTON.

*Mr. President, and Members of the Horticultural Society:*

For the few minutes allotted me in to-day's exercises, I propose a new departure in culture. While I may know as much about agriculture as Horace Greeley, and as much about horticulture as many who have written volumes upon the subject, and even be as much interested in floriculture as any, I will devote my time to-day to a branch some of you may not have given much thought, viz: "Human Culture." Some may think there is no need for thought in that direction; but I can assure you there is much cause for alarm and effort to avert what may prove to be a very serious evil. You ask, how can we do any better than we are doing? Schools and churches are multiplying by thousands, we furnish newspapers and every variety of literature that tends to the highest culture, what more would you ask? All true; but in our anxiety to cram the literature of ages into one small brain, we entirely overlook the development of that brain, and its capacity to retain its cramming.

The more delicate the physical system and the brain, the more susceptible to educational impressions; but, unfortunately, that much

less capable of retaining those impressions. So, if we wish to attain to the highest and most perfect mental condition, we must cultivate the most perfect physical system.

The history of nations is, that as they advance in wealth and luxury, and labor-saving, effeminacy results, and decline and fall follows. Other and more vigorous strains of human vitality come on, go through the same evolution, and pass away. And it will be so on through countless ages to the end of time.

Evolutionists, or those who advocate the development theory, of which they place the human as the highest type, claim that in proportion as primitive man ceased going on all fours, his arms grew shorter and his legs longer and stronger; and for thousands of years after attaining his present stature he got his bread by the sweat of his brow, multiplied and replenished the earth, builded monuments in the various branches of art and science, wealth, luxury, and indolence, followed by enervation. Development of faculty lessened, and in that way nation after nation passed into oblivion, history or tradition. It took Rome three hundred years to die;—at one time mistress of the world, at the end nothing but her brilliant history. All traceable to luxurious, riotous living and indolence: the theologians would say to wickedness. We, as a nation, are fast drifting in the same direction, and should lose no opportunity of seeking a remedy — that is, if we care to avoid the ruin of the nations who have gone before. If we were not constantly importing vigorous blood from foreign or labor countries, it would take much less than three hundred years for us to dwindle into an insignificance that would place us at the mercy of many a nation that has preferred to develop brawn rather than brain. This may sound like the assertions of a dreamer, but if any one will take the pains to look into the history of nations, they will observe that as soon as they gave themselves up to indolence and luxury their doom was sealed. More vigorous, probably more barbarous, peoples came to the front, went through the various stages of development called progress, and wound up in luxury, indolence, and vice.

Some may ask: Is there no remedy for so great a calamity? None that will be listened to or followed.

The fond, and often foolish, mother, says her daughter shall not work as *she* used to. The daughter willingly accepts the situation, sits in the parlor and spends her time on airy nothings, and complains of her back; and tens of thousands of them are invalids before they reach their teens. The boys get a little more outdoor and other exercise, and do not deteriorate quite so rapidly. As an evidence, the farm is producing the brains of the country. The proprietors of them may not be so exquisite and tony, but they win the prize. At the beginning of this, our first century as a nation, a household of stalwart sons and daughters was the pride of more than a majority of homes; at its close we find thousands of homes childless, and the physical system of the mothers rapidly degenerating.

I said there was no remedy for this impending doom that would be heeded. Physiologists have been flooding medical literature for years with their warnings; but, unfortunately, like the seed of the sower, much falls on unproductive ground, because it does not reach those most interested. The remedy must begin first at home, then in the public school, then through all the avocations of life. This wonderful remedy, this elixir of life, the secret that seems to have escaped the notice of nations, is simply *exercise, exercise, exercise.* Not toil, or drudgery, or fatigue, but motion. Every limb and muscle must be brought into active play, whether for profit or pleasure, especially in the growing frame and until mature life.

In myriads of homes the child is told that it is naughty to romp and play and make a noise, and wicked to soil its clothes, and that the good man won't like it if it does thus and so; but if it sits still, folds its hands, learns verses and be good, when it dies will go to heaven. It obeys, fades like a flower and dies,—"The Lord gave, and the Lord taketh away." We take no blame to ourselves. If we fail to lay the foundation of confirmed invalidism in the home, the public school puts on the finishing touch. Nearly six hours a day on benches harder than iron, the soft, pliable frame is compelled to sit cramped until the bones are almost molded to the form it occupies; a few moments recess is given grudgingly. In the interval food is hastily swallowed that has no chance to digest. No opportunities are given for exercise except in good weather, which, from its novelty is generally excessive — exercise to the point of fatigue is almost as injurious as no exercise. This method of culture is kept up for the greater part of each year, during the school-age period, and we wonder why going to school does not agree with the children. From school again into the home — the young lady is expected to improve her mind from books, music, painting, all that is beautiful and pleasant to the eye and ear is acquired, yet the frame, the brain, the temple that is to contain and display all these acquirements is entirely neglected. In our greed for gain we sacrifice everything to our selfish ends. In the material world marvels of beauty in art and architecture are produced, and the foundations that are to support them are laid deep and strong, and which endure long after the hand that constructed them is forgotten. We rear the human frame in all the beauty and accomplishments of an advanced civilization, but we neglect the superstructure and it soon crumbles and is lost.

"Instinct will perpetuate the race; but it develops a savage. Instinct never rises to the plane of reason." It will preserve the race, that is all. Education, as we have it, refines the savage, invents labor-saving, encourages indolence and luxury, enervates and lowers vitality, and the nation or people passes into tradition and history.

I have repeatedly said that there was no remedy, none, at least, that will be followed. If I were to say train your children as you

train your horses, for speed, strength, or endurance, you would smile at the supposed absurdity. Yet I assure you that physiologically it is imperatively necessary. There is a strong belief that labor was entailed upon the human family as a curse, but science, experience, and history disprove the idea. From earliest infancy all animal life requires motion,—first a gradual movement of the limbs, then follows walking, running, leaping, and every conceivable motion or contortion, even to dancing. More animals dance than the human, but the old ones of all species look upon it as very useless and foolish waste of time, if not sinful. The instinct or exercise may lead to injury, especially by its novelty. I have said that exercise carried to the point of fatigue or beyond, is injurious. As a remedy I would systematize all varieties, whether as labor or amusement. As the object of this paper is more to benefit the young, I would select the public school as the most fitting for "human culture," and while I do not object to six hours a day, I do most earnestly protest against six hours cramping or confining the growing human frame anywhere, more especially in a crowded room. The very young should not be confined in crowded rooms at all. While they may be taught at a very early age, all teaching must be with a due admixture of exercise — the physical exercise to be as systematic as the mind training. As the frame begins to harden the body may be kept longer in restraint, never at any time, or any age, to exceed fifty minutes.

In connection with every institution of learning there should be an exercise room, large in proportion to the number of pupils attending. This should be fitted with all the most approved appliances of the gymnasium — dirt or sawdust floor — for exercises of the arms and muscles generally, and a hard, smooth floor for calisthenics and walking. With such a system of mental and physical culture — fifty minutes study for those of the age *to* study, ten minutes brisk exercise, under the supervision of a trained gymnast — the school session might go on indefinitely; digestion would be promoted, consequently, good blood, healthy brains, and fine physical systems for all.

Physiologically, there is no reason why a girl should not be as strong and vigorous as a boy. With the same training, she may row a boat, handle a gun, throw a ball, or, if necessary, hold the plow or swing an ax. And while I do not advocate the rough, coarse exercises that tend to develop musculinity, I would rather a hundred times see women fill all the professions and callings, in peace or war, driving the shuttle or spinning wheel, or leading armies, as Joan of Arc, than to see the delicate, childless, suffering invalids that are now gradually coming into the homes from the older eastern states to the west and across the continent.

And now, gentlemen, while you are devoting your best thoughts to culture in other directions, I beg of you to look into the branch of culture I have mentioned, and you will be surprised, if not

alarmed, at the gravity of affairs. And if I have advanced an idea that will set you thinking or make a move in the direction of "human culture," I will be well repaid for the time I have taken.

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## OCTOBER MEETING.

The October meeting of the Warsaw Horticultural Society was held in the Society's room on the 19th with a good attendance of members present. President Brown called the meeting to order, and suggested the election of a secretary *pro tem.* On motion, Mr. Dennis was called to that office.

### VEGETABLES.

Mr. Hoppe — The season has been very trying on garden vegetables. Potatoes, cabbage and tomatoes less than half a crop. Celery nearly a failure. This is one of the vegetables that can scarcely be grown in such hot dry seasons as the past one. Salsify is growing in favor with me. If properly cooked it is one of our most delicious vegetables.

Mr. Berry — The only way I can raise potatoes these hot, dry seasons, is by making the soil very rich and planting early. Early Rose and Early Ohio are my favorites.

### ORCHARDS.

Mr. Leeper — I have a few apples this year, possibly sixty bushels, but do not think I can find more than four or five perfect specimens in a bushel. My trees are healthy and well furnished with fruit buds for next year's crop. I mulched a portion of my orchard last spring with benefit.

Mr. Emerson — I visited Mr. Rockwell's orchard a short time ago and found some of his young trees bearing a fair crop which was remarkably high colored; but I could scarcely find a perfect specimen. My own orchard set well, but the fruit dropped badly, and little remained on the trees at picking time. I plant my trees twelve or fourteen inches deeper than they grow in the nursery, keep grass and weeds away from them and have no trouble with borers.

Mr. Leeper — This a new theory to me; I have never planted more than two or three inches deeper than they grow in the nursery, and should think such deep planting would retard the growth.

Mr. Johnson — I agree with Mr. Hammond in relation to the danger of jumping to conclusions; but the character of the soil and the general conditions of his orchards are so much alike that I am satisfied the spraying saved the fruit. I should like to know something more about the cost.

Mr. Hammond —Aside from the cost of the pump, which is $6.00, it did not exceed three cents per tree. The mixture I used this season was too strong and scorched the leaves somewhat. Next year I shall use a pound to 120 gallons of water, and am not sure but a yet weaker mixture will be preferable. I am quite sure that if I had sprayed my trees a week earlier — just after the bloom had dropped — that the success would have been greater. I shall carefully test all these points next season.

## BERRIES.

Mr. Hoppe — My observations shows the general condition of raspberry plantations to be poor. My own looks fairly well, which I attribute to the rich soil and good cultivation. A portion of my patch, which was mulched last spring, has done the best.

Mr. Johnson — Would you plant strawberries as late as this?

Several members — Yes, if well mulched.

Mr. Dennis — The cultivation will be cheaper next year, if the ground is well prepared and planted in the spring.

Adjourned to meet at Hamilton the third Wednesday in November.

## OUR ORCHARDS, SHALL WE REPLANT THEM?

BY A. C. HAMMOND, WARSAW.

That the present condition of the orchards of Hancock County is unsatisfactory all must admit. And many claim that the seasons and conditions of the soil have so changed that we should give up fruit-growing, and depend upon a more highly-favored clime for our supply.

This is a weakness we should scorn to exhibit, but rather profit by the dearly-bought experience of the past three years, and press forward until success is reached.

How badly are our trees injured, and how many of them will again become vigorous and fruitful? is a question often asked by the discouraged orchardist as he contemplates his dead and dying trees. A year ago it was estimated that about fifty per cent. of the apple trees in our county were dead or dying. But we now find that many that promised at that time to recover did not possess sufficient vitality to endure the low temperature of the past winter and the protracted drouth of the present summer, and are now dead or show the "sere and yellow leaf," and sixty-five per cent. will be none too large an estimate of the loss we have suffered. The thirty-five per cent. of healthy trees that remain are principally those that have been planted less than ten years, although we occasionally find a tree, among all varieties, that is more healthy and fruitful than those around it. This fact seems to show that the destruction is not caused by an "inherent tenderness" of varieties, but by certain conditions of soil or growth of the tree not yet fully understood. If this estimate is correct, and I think it will not be questioned, the importance of replanting our orchards will readily be seen. But, asks the farmer, who wants to plant two or three hundred apple trees for a family orchard with a view of marketing whatever surplus there may be, what varieties and on what location shall I plant, and how shall I cultivate to avoid the disasters of the past? One tells me to plant on high, dry ridges, another on low, wet land; and again I am told that nothing but the newly-introduced Russian varieties will endure our worse than Russian winters; while another says plant those of our well-known varieties that have in years past given the best results, and as nearly as possible supply the necessary conditions of soil, moisture and growth, and in a few years you will have apples to eat and apples to sell. When doctors disagree who shall decide?

We generally find experienced fruit men unwilling to recommend lists for planting, as they well know how greatly certain varieties are affected by cultivation, soil and location, and that a variety that does well in one orchard may be a failure in the next.

After thirty years' experience in orcharding and testing two hundred varieties of apples and carefully observing their habits, not only on my own grounds, but in different sections of the west, I have come to the conclusion that fifteen or twenty varieties are as many as the ordinary farmer should plant.

If I was to plant an orchard of two hundred trees next spring, I should select a flat, moist piece of land, capable of good surface drainage — if tile-drained all the better — and plant two rods apart. Fifteen varieties, four summer, four fall and seven winter, will give a succession for at least ten months. The following is the selection I should make for a farmer's orchard:

Summer — Five Red Astrachan, five Sops of Wine, five Benoni, five Golden Sweet.

Fall — Five Maiden's Blush and five Wealthy, five Mother, five Bailey's Sweet.

Winter — Sixty Ben Davis, forty Minkler, twenty Jonathan, ten Grimes' Golden, ten Red Canada, ten Willow Twig, ten Paradise Winter Sweet.

Red Astrachan is our most popular summer apple, beautiful in appearance and fair in quality; but, notwithstanding its Russian origin, the trees are failing at twenty years of age; but I would still plant it. Sops of Wine is a hardy, vigorous tree, and bears annual crops, but is only second rate in quality. Benoni is a pretty little tree that yields good crops of superior fruit, and is a variety that should be found in every orchard.

Maiden's Blush is one of our best known and popular apples, and should head the list of fall varieties. Wealthy should be better known and more generally planted. It originated on the banks of Lake Minnetonka, and comes the nearest to being an "iron-clad" of anything I am acquainted with. The fruit is large, handsome and excellent in quality, and should be in every collection. Mother is a small, slow-growing tree, that bears a heavy crop every other year. It is so beautiful in appearance and good in quality that it should be planted in every orchard. Bailey's Sweet is, all things considered, the best fall sweet apple that we have. It is only moderately productive, but excellent in quality.

Coming to winter apples we find it more difficult to make a selection, and it will be asked why continue to plant Ben Davis when it is well known that seventy-five per cent. of this variety have died within the past three years? The reply will be that these trees have borne much more heavily than others, but have not received the extra cultivation and fertilizing that their over-bearing demanded, and were, therefore, unprepared to withstand the unfavorable climatic influences with which they were overtaken. It is safe to say that under the same circumstances the Ben Davis will endure as low a temperature as anything grown in our climate, not excepting the Russians. I would therefore plant liberally of Ben Davis.

Minkler is an apple of good quality and appearance and one of the best keepers, and should be found in every farmer's orchard. Jonathan and Grimes' Golden are early winter apples. They ripen and drop early, but are so good in quality that we cannot afford to give them up.

Red Canada is a slow-growing, hardy tree, but somewhat variable on different soils. The fruit is handsome and good, and one of the best for family use.

Paradise Winter Sweet is one of the best long-keeping, sweet apples, and should be more generally planted.

Having made a selection of and planted the proper varieties, the question of cultivation will next require attention, and upon this, more than anything else, depends future success. The great diffi-

culty to be overcome in growing orchards is hot, dry summers, and hence the necessity for intelligent cultivation. To produce, healthy, hardy trees, capable of enduring the low temperature of our continental winters, a healthy, regular growth must be maintained throughout the entire season, which will enable the wood to ripen up naturally, and the tree to go into winter quarters in such a condition as to be able to endure the lowest temperature we ever experience.

Every farmer knows that if his cornfield is well pulverized and carefully cultivated, that he will have corn in spite of the drouth, and so with the orchard. If the soil possesses the proper degree of fertility, and is thoroughly pulverized by constant and careful cultivation, the moisture will be brought up from below by capillary attraction, and the fine particles of earth will also permit the air to enter, which coming in contact with the cooler soil, leaves a certain portion of its moisture.

Young orchards may be planted to any hoed crops the first five or six years, but after it comes into bearing nothing but the fruit should be removed from the ground. I find it an excellent plan to sow to rye about the middle of August, and about the first of June, just before it blooms, plow it under and cultivate well with the pulverizer or harrow until August, when the same process of sowing rye may be repeated. After following this plan three or four years the orchard may be sown to clover, which should be mown and left on the ground. In a year or two it will begin to fail, when it should be plowed up and the orchard again sown to rye. By these means the necessary conditions of fertility and moisture will be maintained to produce a normal growth which will ripen at the proper time.

If we allow grass to grow in the orchard it will extract all the moisture from the soil, leaving it so hard and dry that none can be drawn up by capillary attraction from below or enter it from the air, and the tree is therefore compelled to stop growing and ripen up its wood for winter. Our drouths are often followed by wet weather, which again forces the sap into circulation, and a new growth is started. The trees are caught in this condition by a severe cold snap freezing the crude sap, which ruptures the cells and loosens the bark on the trunk, often fatally injuring the tree.

### TO RECAPITULATE.

First — The primary cause of the destruction of fruit trees in Central Illinois is not cold, as the lowest temperature we have ever known, 32° below zero, will not kill any of our ordinary varieties if the trees are in the proper condition in the fall.

Second — To insure this condition we must keep the soil in a high state of fertility by plowing under green crops, or the application of barn-yard manure or other fertilizers, and cultivate carefully during the hot, dry weather of June, July and August.

Third — Plant orchards without thought of failure. Give the tree peddler, with his gaudy pictures and wonderful specimens, his iron-clad apples, curculio-proof plum and Russian apricots, a short answer but go to your nearest reliable nurseryman and get the varieties that are known to succeed in your locality without regard to reputed hardiness, and you will grow just as many, and just as good, apples as you did twenty-five years ago.

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## NOVEMBER MEETING.

The November meeting of the Warsaw Horticultural Society was held in Hamilton on Wednesday, the 16th, with President Brown in the chair.

The question of enriching and cultivating the orchard and combating insects seemed to be prominent in the minds of all present, and the opinion was generally expressed that the time had come when the codling moth must be poisoned, the borer looked after twice a year, and the soil brought up to a higher state of fertility if we would grow fine, handsome marketable fruit.

Messrs. Gates, Ash, and Rockwell were greatly interested in the subject of spraying fruit trees with arsenical poisons to destroy insects, and desiring to get at all the facts, asked Mr. Hammond if it was not possible that his exceptional crop of apples referred to at the last meeting could be attributed to some other cause. A heavy crop of clover had been left on the ground as a mulch through the severe drouth, and might not this be a partial explanation?

Mr. Hammond — The fact that so large a proportion of the apples in the sprayed orchards were perfect, and in adjoining orchards scarcely a perfect specimen could be found, seems to be conclusive evidence that the poison killed the insects and saved the fruit.

There seemed to be a very general agreement that the late disasters to apple-trees was mainly caused by double cropping the land and starving the trees, and that the only road to success was by enriching the soil with barnyard manure, plowing under green crops, or allowing clover to grow and remain uncut on the ground, which answers the double purpose of mulch and manure.

In reply to the question of the President, if confined to three varieties of apples, one each summer, fall and winter, what would they be?

Mr. Gates said: Red Astrachan, Rambo and Ben Davis.

Mr. Hammond—Sops of Wine, Porter or Maiden Blush, and Ben Davis. Others preferred the Benoni for summer, but agreed that Ben Davis would be the most desirable winter variety.

Mr. Hoppe desired to impress on the Society the opportunity of giving more attention to the kitchen garden, as considerations of economy, health and comfort, demand that the farmer's family be supplied with vegetables in greater variety and abundance than they generally are.

## SOMETHING EAST.

BY EDWARD DENNIS, HAMILTON.

I saw from the beginning of my journey that men, in the majority, are creatures of dissatisfaction, and I fully believe discontent was nowhere more plainly visible than right at home, and no class of men so generally grieved as the horticulturist and farmers. Truly, there is no place like home; and there is no other state in the United States in which a man tells the truth any more fully when he repeats this old adage than in Illinois.

The home of the ordinary well-to-do farmer of this country should be the place where nothing but contentment ever comes, for verily he has much to make him happy and little to grieve compared with many others, and, perhaps, the best plan for gaining contentment would be a trip like my own, and see some of the obstacles which men in other localities have to overcome in order to even make a living, saying nothing of the luxuries of life. Riding on a railroad is a poor way of seeing the most favorable part of the country, yet in all the distance from Hamilton to the Atlantic there is not a place that will compare with our own. We left Hamilton on the 26th of July excessively dry and dusty, thirty hours' ride landing us in Buffalo. The last nine of the thirty was spent in passing from Detroit to Buffalo, where, if it was possible, the drouth was more severe than at home, and not a half hour of the time that we did not see men, women and children fighting fire along the road. Leaving Buffalo after dark we saw, comparatively, nothing of the great State of New York, running the entire distance across the state in about eight hours. We awoke in the morning on the border lines of Massachusetts in the midst of a most excellent rain. From this time on, the entire time of our absence, there was the complete reverse of Hamilton, cold and rainy, averaging one or two days of the

week that it did not rain. Perhaps this is enough for the trip. Why should men be contented here? The farmers here can raise ten acres of ordinary farm products with the same help and at less expense than his eastern brother can do. He can market his products at a better profit than he can, leaving a very good margin in favor of the western farmer. In fact, the ordinary western farmer wastes more than many of them can possibly raise. The farmer who raises a good crop there has to apply a good crop of fertilizer each year, equal to, or greater than, the crop he takes off. Some of the things that made me think more of Illinois was harvesting with scythes, wading about, with rubber boots on, in bogs and swamps, mowing grass and carrying it out with forks, where it might cure and be gotten at with teams, and oxen at that. Again, they have to feed from their barns seven or eight months in the year. If they have stock to fatten, it costs them about as much as they get for it. There is little local market for fat stock. Local butchers can buy just as cheap what suits them better. Chicago beef and pork, nicely dressed, shipped in refrigerator cars, and packed in nice store-houses, takes the eastern meat trade. Most of the railroad towns have their headquarters for Chicago meat.

For a hundred miles or more outside the large cities milk-trains run daily, carrying another of the important farm products at prices that, I fear, the western farmer would say, too small for me. Every man must get out in the morning, do his milking, put it in cans furnished for the purpose, holding ten quarts, take it to the station for early trains at prices varying from eight cents to twenty-two cents per can, according to the time of year; yet most of them say this pays — the best of anything they can do. Another saying that is true, is that the boys have left the farm. Many of the old men are yet working away, but the boys are in the cities, in store or manufactories. The farms are consolidating. Where there used to be farms of a few acres they now number hundreds, and vary in price from five to fifty dollars per acre, and are generally poor property at any price. It seems to me that people and places are deteriorating.

Except in the manufacturing centers, there is but little being done. Farms, that a few years ago were to all appearances paying, have been turned to pasture. The highways are, many of them, kept clear enough for one team, a person needing to watch for passing room. Everything seems small, crowded and uncomfortable. Homes are kept in good repair, usually, and buildings well painted. The general explanation is, "Oh, you Westerners can furnish us what we need cheaper than we can raise it," and they *do not* raise much — very little small fruit — the wild growing abundantly in the neglected fields. I think from leaving home to the Hudson we did not see a wagon-load of apples. After going into Massachusetts we saw some apples, and some of the most beautiful pear orchards I ever saw — literally loaded to the ground with fruit. The pear or-

chards look young and thrifty, while the apple orchards were old, broken and twisted.

In at least one respect I found the people there just the same as at home, they were willing to buy Russian apples and budded trees (that never die, and bear always, because usually they won't start), at seventy-five cents to one dollar and a half. Chase & Bros. getting a large part of their spare cash. The Baldwin and Rhode Island Greenings being the standards, while they are buying largely of Duchess, Red Astrachan, Utter's, Walbridge, Peewaukee, and the humbugs with names long enough to kill them.

About the only other matter that impressed me very much was on the way home. In the southern part of Canada was about twenty acres of the finest peach orchard I ever saw; the peaches looked of fine varieties, and many trees were breaking down under their loads. I think if orchardists here would have to work and wait for results as they do there, horticulturists would be scarce. I saw many orchards that had been set from eight to ten years, that would not exceed one-and-a-half inches in diameter, with the first few scrawny apples that would not begin to compare with the Plate Book.

An informal talk was then indulged in by the Society, which was very interesting, but no new facts were brought to light worthy of being reported here.

On motion of A. C. Hammond, the lady members of the three Floral Societies of Hancock County — Warsaw, Monte-Bello, and Carthage, were invited to a representation at the meeting of the State Society, at Princeton, for 1887.

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